JAN 30 1923 Medical Lib.

The British Medical Journal

THE JOURNAL OF THE BRITISH MEDICAL ASSOCIATION.

Including an Epitome of Current Medical Literature.

WITH SUPPLEMENT.

No. 3238. SATURDAY, JANUARY 20, 1923. **Price 1/3**

By Lt.-Col. ROBERT HENRY ELLIOT, M.D., B.S.Lond., F.R.C.S.Eng., I.M.S. (rtd.)

A TREATISE ON GLAUCOMA.
Second Edition, Revised and Enlarged, 1922. With 215 Illustrations. 30s. net.

TROPICAL OPHTHALMOLOGY.
With 7 Plates and 117 Illustrations. 31s. 6d. net.

THE CARE OF EYE CASES:
FOR NURSES, PRACTITIONERS AND STUDENTS.
With 135 Illustrations. 12s. 6d. net.
THE OXFORD MEDICAL PUBLICATIONS.

GLAUCOMA:
FOR THE GENERAL PRACTITIONER.
With 23 Illustrations. 4s. net.

COUCHING FOR CATARACT.
With 45 Illustrations. 7s. 6d. net.
H. K. LEWIS & Co., LTD.

OXFORD MEDICAL PUBLICATIONS

CATARACT & ITS TREATMENT
By H. KIRKPATRICK, M.B.,
Lt.-Col. Indian Medical Service (Retired); late Superintendent, Government Ophthalmic Hospital, Madras.
Pp. 201. Price 12s. 6d.
HENRY FROWDE and HODDER & STOUGHTON,

OXFORD MEDICAL PUBLICATIONS.

GOADBY'S DISEASES OF THE GUMS AND ORAL MUCOUS MEMBRANE. Super royal 8vo. 400 pp., 106 Black and White Illustrations and 8 Colour Plates. £2 2s. net. Just published.

HEWITT'S ANÆSTHETICS & THEIR ADMINISTRATION. Fifth Edition. Edited by HENRY ROBINSON, M.A., M.D., B.Ch. Demy 8vo. Cloth. Illustrated. Price 30s. net.

CROWTHER'S PRACTICAL PHYSICS. Crown 8vo. Cloth. Illustrated in Colour and Black and White. Price 10s. 6d. net.

LAWSON'S WAR BLINDNESS AT ST. DUNSTAN'S. 156 pp. Demy 8vo. Cloth. 7s. 6d. net.

BAYLISS' THE COLLOIDAL STATE IN ITS MEDICAL & PHYSIOLOGICAL ASPECTS. Cr. 8vo. 100 pp. Illus. 6s. net. Just published.

LANGDON BROWN'S THE SYMPATHETIC NERVOUS SYSTEM IN DISEASE. Second Edition. Demy 8vo. 176 pp. Illustrated. Price 10s. 6d. net. Just published.
HENRY FROWDE and HODDER & STOUGHTON, The LANCET Building, 1, Bedford St., Strand, W.C.2.

ESSENTIALS OF CHEMICAL PHYSIOLOGY For the Use of Students.
By W. D. HALLIBURTON, M.D., F.R.C.P., LL.D., F.R.S., Professor of Physiology in King's College, London.
ELEVENTH EDITION. With Coloured Plate and numerous Illustrations. 8vo. 8s. 6d. net.
LONGMANS, GREEN & Co., 39, Paternoster Row, London, E.C. 4.

NOW READY. Demy 8vo. Pp. xii + 196. With 50 Figs. Price 10s. 6d. net (postage 6d.).

DISEASES OF THE HEART:
A HANDBOOK FOR PRACTITIONERS & STUDENTS.
Containing an Account of Clinical Electrocardiography.
By I. HARRIS, M.D., L.R.C.P.(Ed.), Hon. Physician-in-Charge, Cardiographic Department, Liverpool Northern Hospital.
BAILLIÈRE, TINDALL & COX, 8, Henrietta Street, Covent Garden, W.C. 2.

NOW READY. Demy 8vo. Pp. xii + 244, with 32 Illustrations. Price 7s. 6d. net, postage 7d.

PRACTICAL ANÆSTHETICS FOR THE STUDENT AND GENERAL PRACTITIONER.
By CHARLES F. HADFIELD, M.B.E., M.A., M.D. (Camb.), Hon. Anæsthetist, Prince of Wales's Hospital, Tottenham; Assistant Anæsthetist, St. Bartholomew's Hospital.
BAILLIÈRE, TINDALL & COX, 8, Henrietta Street, Covent Garden, London, W.C. 2.

NOW READY. Demy 8vo. Pp. viii + 470. Price 10s. 6d. net, postage 10d.

MISTAKES AND ACCIDENTS OF SURGERY.
By HAROLD BURROWS, C.B.E., M.B., B.S. (Lond.), F.R.C.S., Assistant Surgeon, Royal Portsmouth Hospital; late Consulting Surgeon, British Expeditionary Force in France; late Hunterian Professor of Surgery at the Royal Coll. of Surgeons of England, &c.
BAILLIÈRE, TINDALL & COX, 8, Henrietta Street, Covent Garden, London, W.C. 2.

THIS WEEK YOU SHOULD CONSIDER THE VARIOUS FORMS OF LIFE ASSURANCE

THE MEDICAL INSURANCE AGENCY HAS ALREADY EFFECTED LIFE AND ENDOWMENT ASSURANCES FOR MEMBERS OF THE PROFESSION TO SECURE OVER

£600,000

Disinterested advice is given in connection with all classes of Assurance. Whole Life, Whole Life by Limited Payments, Endowment, Children's and Educational Endowments, and Deferred Annuities.

THE MEDICAL INSURANCE AGENCY EXISTS TO PROTECT YOUR INTERESTS AND SAVE YOUR MONEY.

You should address (Dept. H.O.J.) c/o BRITISH MEDICAL ASSOCIATION, 429, STRAND, LONDON, W.C. 2

STABILARSAN—

BOOTS

(Registered Trade Mark).
British Patent No. 177283 of 1922.

Approved by the Ministry of Health.

A NEW chemical compound of Salvarsan and glucose; **low** in toxicity, **high** in curative power; the **greatest advance** in the simplification of——

ARSENOBENZOL TREATMENT

SUPPLIED in liquid form **ready for use,** the syringe being filled **directly from the ampoule. STABILARSAN** is **not** an untried specific. Prolonged clinical trials and exhaustive experimental investigations carried out during the last two years have given **uniformly excellent results.**

The purity and freedom from toxicity of all batches of **STABILARSAN** are accurately controlled by strict chemical and biological tests in our own laboratories before issue. The material is then finally tested and passed for sale by the Government Director of Biological Standards.

STABILARSAN is a product of British Research, is of British Manufacture, and is an invaluable addition to the armoury of British Medical Men.

SPECIAL LITERATURE ON APPLICATION.

BOOTS PURE DRUG CO. LTD.,

MANUFACTURING CHEMISTS AND MAKERS OF FINE CHEMICALS,

Station Street, NOTTINGHAM.

A British Medical Association Lecture

ON

SOME PRACTICAL DIFFICULTIES IN OBSTETRICS AND GYNAECOLOGY.*

BY

COMYNS BERKELEY, M.D., M.CH., M.A.CANTAB., F.R.C.P.LOND.,

OBSTETRIC AND GYNAECOLOGICAL SURGEON TO THE MIDDLESEX HOSPITAL; SURGEON, CHELSEA HOSPITAL FOR WOMEN; SENIOR OBSTETRIC SURGEON, THE CITY OF LONDON MATERNITY HOSPITAL.

RUPTURE OF THE PERINEUM.

IF sufficient care is not taken, particularly when attending a woman in her first labour, to ensure that the occiput has escaped under the pubic arch before the birth of the head by extension is allowed to occur, a tear of the perineum will almost certainly result, and this is not infrequently fairly severe. Now tears of the perineum should always be sutured, and, although it may seem superfluous to say this, yet one has often heard a doctor state that he never inserts any sutures unless the laceration is a bad one. A wound in such a position, however, increases the risk of bacterial infection; it may slough, with resulting septic intoxication, and, inasmuch as it is an indication that some part of the pelvic floor has been injured, it is partly responsible for prolapse of the uterus should this occur later on.

Not only should all tears be sutured, but they should be efficiently sutured, and this entails a thorough examination of the injury. I do not think I shall exaggerate if I say that many doctors are satisfied with an inspection of the base of the perineum as it stretches between the vulval orifice and anus, and, if the skin in this situation is intact, assume that the perineum is not ruptured; or, if a laceration in this situation can be seen, are satisfied that this is the only part that requires attention.

Now, apart from the risk of sepsis, a mere laceration of the skin and immediately subjacent tissues between the vaginal orifice and the anus is not of great moment. If, however, in all cases the patient be properly examined it will be found that in certain of them the anterior face of the perineum, covered by the lower inch or so of the posterior vaginal wall, is torn, and it is this injury that plays a part in prolapse of the uterus, meaning, as it does, that the levatores ani are torn or unduly stretched. After labour, therefore, every patient should be placed in the lithotomy position across the bed and the labia separated; with the aid of a good light the practitioner will then be able to determine accurately the extent of an injury should it be present, and if so to treat it efficiently by inserting deep sutures. It is impossible to make a proper examination with the patient in the left lateral position. That this is often deemed to be sufficient is evident by the fact that one is not infrequently called upon to perform plastic operations on the vagina in cases of prolapse in which the skin between the vulval orifice and anus is perfect, but in which a proper examination will disclose that the perineal body has been badly torn and has not been repaired.

OCCIPITO-POSTERIOR PRESENTATIONS.

The most severe ruptures of the pelvic floor are due to the use of the forceps, as a first choice in treatment, in those third or fourth vertex presentations in which the birth of the head is delayed because the occiput has rotated backwards. What is the reason for such unscientific treatment? My experience tells me that either the doctor does not recognize this complication, or, if he does, is usually unacquainted with the correct way to treat it.

At the commencement of labour there should not often be much difficulty in detecting an occipito-posterior presentation if a routine abdominal examination is made. This diagnosis can be confirmed by vaginal examination when the cervix is dilated sufficiently to allow the presenting part to be palpated easily. Unfortunately such routine examinations are not by any means universal. If, as rarely happens, such examinations are postponed until there is an obvious delay in the birth of the head, it must at once be admitted that a correct diagnosis is not at all an easy matter, even for one with special experience. When the membranes have ruptured and the uterus is strongly contracting an abdominal diagnosis is very difficult, whilst the large caput succedaneum prevents efficient palpation of the presenting part by vaginal examination.

I think it is a fair statement to make that in very many of these cases the doctor rightly comes to the conclusion that the delay in the birth of the child is due to disproportion between its head and the pelvis of the mother, but that he remains ignorant of the cause of this disproportion until, having applied the forceps more than once and finding that they keep slipping, he at last does what he should have done hours before—that is, make a thorough examination.

If the head is presenting as a third or fourth vertex one should be able to feel in front, early in labour, knobs due to the arms and legs, instead of the usual broad back. The head has not entered the pelvis as far as it should have done, the foetal heart, if heard at all, is heard out towards the flank, and there is often a history, which is very suspicious, of premature rupture of the membranes. Later, when the cervix is sufficiently dilated, the sagittal suture can be felt in one or other oblique diameter and the anterior fontanelle can be felt, showing that the head is not properly flexed. With such information, if it is found that as time goes on the head is not descending so rapidly as it should do in spite of good uterine contractions, it is at once possible to visualize the cause and the appropriate treatment can then easily be applied. But supposing the doctor is not called in until the second stage of labour has become prolonged, or has allowed it to be prolonged before making his examination, he can, in spite of the large caput succedaneum obliterating the sutures and anterior fontanelle, still arrive at a correct diagnosis by passing his hand up the side of the head and feeling in which direction the pinna of an ear is pointing. In first labours an anaesthetic must be given for this examination.

The causes of delay can easily be understood. As the head is incompletely flexed the occiput rotates back below the sacral promontory and the fronto-occipital diameter of 4½ in. has to pass through the vaginal orifice, whereas when the occiput has rotated forwards and the head is properly flexed a diameter of 3¾ in. distends the orifice. Again, the occiput being behind, the greatest circumference distending the vaginal orifice is 14 in., instead of 12 in. when the occiput is in front.

On the other hand, the doctor may have diagnosed correctly the misplacement but does not treat it scientifically; the result will be just the same as if he had not made a diagnosis—namely, a very badly lacerated pelvic floor, often into the rectum. This means that frequently a recto-vaginal fistula results, and in due course prolapse of the uterus is nearly certain to occur. But this is not all; the child is often born in a condition of white asphyxia or is delivered dead, or dies soon after delivery from intracranial haemorrhage due to the severe pressure of the forceps.

The treatment, therefore, is with the internal hand to flex the head by pushing up the forehead and to rotate the occiput forward. Such a procedure, with the patient anaesthetized, unless labour has been very prolonged, is not difficult if care be taken when the head is being rotated with the internal hand to turn the anterior shoulder to the front with the other hand on the abdomen. The neglect to turn this shoulder will result in the head being twisted on the neck only, and when it is released it will return to its original position. If it be found impossible to rotate the occiput forward by such means success may still be obtained by passing the internal hand above the head and then seizing the shoulders and rotating them. After the head has been rotated the child can be delivered by the forceps.

There remain those rare cases in which, owing to the strong pains and undue prolongation of labour, the head of the child has been driven down so tightly into the pelvic cavity that its rotation is impossible. If the child is dead it should, in the interest of the mother, be delivered by perforating its head. If the child is alive, there remains only delivery by the forceps. The proper forceps to use are the axis traction, because the fact that the handles are free to move in any direction will at times allow the occiput to rotate even at the last moment; serious injury to the mother will thus be averted.

THE OBSTETRIC FORCEPS.

I often think that, in the case of womankind, this additional supplication should be added to the Litany: "From the obstetric forceps and uterine curette, Good Lord, deliver us." They are the two most dangerous instruments which any doctor may legitimately employ in the practice of his

* Delivered before the Northamptonshire Division of the South Midland Branch on November 14th, 1922.

profession. By far the most common indication for the use of the forceps is unusual delay in the birth of the child, and in the vast majority of cases when the forceps are used it is for such a purpose.

Now, strictly speaking, in such cases the forceps should only be used when it is certain that, if the uterine contractions were only strong enough, Nature would herself deliver the child. Hence it comes about that the forceps, when used legitimately, are in most cases employed when the patient is suffering from the condition known as a "sluggish uterus."

No woman with a contracted pelvis should be delivered by the forceps in whom, if only the pains had been strong enough, the head could have been moulded and pushed through the pelvis. It may be taken, therefore, as a maxim that if, in the presence of strong uterine pains and a normal presentation, allowing plenty of time, the child is not born before the condition of the mother warrants interference by the doctor, then the case is not suitable for delivery by the forceps.

It is a fact that the forceps are used much more frequently in private practice than in the labour wards of a hospital, and this in spite of the fact that the percentage of difficult cases is greater in hospital than in private practice. The reasons for this are not far to seek. In the first place the general practitioner is apt to be worried by the relatives of the patient if the child is not born as soon as they think it should be. In the second place—and here its use is if anything more reprehensible—the instrument is employed to save his time.

Delivering the child with this instrument before the os is properly dilated is responsible for a large amount of misery to many women, and every now and then is the direct cause of their death or that of their children. Now, it is an aphorism that the forceps should never be applied and the head delivered until the os is fully dilated, except in rare cases, and then only when this canal has been dilated with the gloved fingers. There are some who do not hesitate to use the forceps before the os is sufficiently dilated, relying on the forceps to do this. In not a few instances I have known the uterus by such a procedure torn right into the broad ligament, with a resulting haematoma, on occasions followed by suppuration, and twice I have known a patient bleed to death from rupture of the uterine artery. Fortunately such catastrophes are rare because the softened cervix allows itself to be stretched. Quite commonly, however, the cervix is split up to the vaginal fornix, and this is not realized at the time. Moreover, even apart from such a laceration, by the time the forceps have stretched the cervical canal sufficiently to allow the head to pass, the cervix has been pulled down so much that its attachments, especially the lateral cervical ligaments, become stretched or torn and the integrity of the pelvic floor is severely damaged, with the inevitable result of prolapse of the uterus later on. Only last week a patient with a normal pelvis, and in whom a normal vertex had presented, was admitted to hospital with the history that delivery by the forceps had failed. On examination the os was found to be only partially dilated, and the head of the child had escaped through a laceration of the uterus in its lower uterine segment into the abdominal cavity.

Now let us turn to the use of the forceps when there is a disproportion between the head of the child and the pelvis of the mother. I will pass by the cases due to malpresentation, since these should be rectified, and also those in which the head of the child is larger than normal, since these are quite rare, and, moreover, the treatment is the same as when the pelvis is smaller than normal. From time to time I meet one of my old students at the hospital, and every now and then one of them will tell me with pride how, after a tremendous struggle and with the aid of one of his feet against the side of the bedstead, he has been able, by pulling with all his might, to deliver the child. Not much of a testimonial to my teaching, you will say! Inquiry as to the child's health will elicit the information that unfortunately it was born dead or died a few hours after delivery—the death being due, of course, to intracranial haemorrhage. The unscientific use of the forceps in this connexion is responsible every year for a large number of foetal deaths, some maternal deaths, and much maternal morbidity.

In such cases of disproportion, however, it frequently happens that the pains are not very strong, and it will be asked in what circumstances can the practitioner justifiably use the forceps. The head may be arrested above the brim, in the brim, or in the pelvic cavity. If the head is movable above the brim the forceps are absolutely contraindicated. If the head is delayed in the brim a most careful examination should be made, under anaesthesia, of the relative sizes of the head and the pelvis. If no malpresentation is present, and if, in the case of a flattened pelvis, the biparietal diameter has passed through the brim, it is evident that the disparity in size is not great; if in the case of a generally contracted pelvis the head is held fast, additional time should be given to Nature for the head to mould, when as a rule Nature's efforts will suffice. The general condition of the patient should be treated and the forceps only applied when the condition of the mother—as shown by the pulse rate and the fact that she is not sleeping between the pains—demands interference. The necessity for such a warning is evidenced by the fact that a strong pull will be necessary, and, however careful the practitioner may be, lacerations of the perineum are likely to result, and certainly the head of the child will be unduly compressed, and very likely for some time. If the head is delayed in the pelvic cavity and does not advance with the pains or recede in the interval, and if the vagina is oedematous and hot and dry, the forceps again are contraindicated. I need not further discuss the care that should be exercised in the application of the forceps. It seems superfluous to mention that the blades should be applied inside the uterus if the head has not yet passed through the cervical canal, and they should be in contact with the head. And yet I know of two cases in which the forceps were forced into the broad ligament, the lower uterine segment grasped as it was in contact with the head, and by strong traction torn right off the upper uterine segment.

CURETTING.

The operation of curetting is extremely common, and is constantly being abused, employed as it is from time to time for most of the conditions which may be attributed, without any adequate reason, to local disease of the uterus. In a large number of cases the operation does no good, whilst in some, from time to time, it is followed by such disasters as intraperitoneal haemorrhage, pelvic haematoma, pelvic cellulitis, salpingitis, and even death. The operation of curetting, as too often practised, consists in removing the mucous membrane lining the body of the uterus. Such a procedure presupposes that this lining is diseased, but in many cases it is quite healthy.

Let us review the sort of cases for which curetting is most frequently employed. In the first place we will take leucorrhoea, because this is the commonest symptom for the relief of which the operation is performed. The normal discharge escaping from the vagina is sticky, from the mucous secretion of the cervical and Bartholin's glands. Just before menstruation and during pregnancy there may be such an excess of discharge as to cause a certain amount of vulval discomfort and to soil the underlinen. A leucorrhoeal discharge in excess of this, and at other times sufficient in quantity to necessitate the use of a diaper, is abnormal and should be treated. Curetting the body of the uterus, however, in such cases will do no good at all, and the doctor may well be disappointed. The discharge from the corporeal mucous membrane is clear and watery, and, although women suffering from chronic endometritis may have severe leucorrhoea as well, most of the discharge is due to a chronic inflammation of the cervical mucous membrane, and as this is seldom treated efficiently disappointment results.

The cause of excessive leucorrhoea is a chronic inflammatory condition of the cervical mucous membrane. Such a condition is often found in women who have had children, but unmarried women who have not had children not infrequently suffer from it. The endometrium of the body is not as a rule affected, the only symptom being leucorrhoea. When a vaginal examination is made quite commonly an erosion is detected.

Now, the operation of curetting for leucorrhoea, as generally performed, consists in removing the fairly thick, loosely attached soft mucous membrane of the body of the uterus, whilst the thin mucous membrane of the cervix which is firmly attached to the muscle, and in which are embedded the racemose glands, is not curetted at all, or so perfunctorily that the diseased glands remain. When the only complaint is leucorrhoea and an operation has been decided upon, there is no need to curette the body of the uterus; it will not do any good and it may do harm. The cervical mucous membrane, however, should be thoroughly scraped with a sharp spoon, and the erosion if present should be similarly treated.

Another common complaint for which curetting is performed is congestive dysmenorrhoea; this is due to an additional

flow of blood to the genital organs, which causes increased tension, stretches the nerves, and so gives rise to pain more or less severe. Removing the mucous membrane of the body of the uterus cannot prevent the additional flow of blood naturally taking place prior to menstruation, neither can it remove the nerves or interfere with their distribution. Hence the operation is an unqualified failure. Why, then, is it so commonly employed? The answer must be that in some cases it is followed by alleviation of the menstrual pain; but in these cases the pain that is relieved is not due to the congestive dysmenorrhoea, but to the spasmodic variety with which it is in such cases associated. Moreover, even then it is not the curetting that relieves the patient, but the dilatation of the cervix antecedent to the curetting, so that the latter is superfluous. It is obvious, therefore, that the disappointment so often associated with the operation when performed for dysmenorrhoea could be obviated if doctors would only take care in diagnosing which variety of dysmenorrhoea their patient is suffering from.

Another class of case for which this operation is performed is that of excessive uterine haemorrhage. Such diseases as chronic endometritis, mucous polypi, and subinvolution, with or without retained products, are successfully treated by this method. In the absence, however, of a careful local examination and a full consideration of all the circumstances, the uterus is quite frequently curetted for haemorrhage due to conditions in which it can do no good, and may perhaps do harm. Among these I may mention excessive bleeding due to an abnormal function of the endocrine glands, fibrosis of the uterus, salpingo-oöphoritis, and fibroid tumours.

Lastly, curetting is often employed in cases of sterility, without the doctor certainly ascertaining that it is not due to some condition of the husband which renders him sterile. I should not be surprised to hear, in the majority of cases in which curetting has been employed for sterility, that the seminal fluid of the husband has never been examined. If one comes to think of it, however, considering that it is calculated that in 10 per cent. of all cases of sterility the fault is on the husband's side, what a criminal thing it is to subject a wife to the discomforts and dangers of such an operation before ascertaining that the testicular secretion of her husband is normal. However, in the absence of local disease, curetting for sterility is on occasions dramatically successful. But here again it is a question whether the actual curetting, in most cases at any rate, is the cause of the success. More probably it is due to the dilatation of the cervix, in spite of the fact that many authorities consider the curetting to be an essential factor.

Apart from the indications I have given, the cervix should certainly be dilated, whatever the age of the patient, in those cases in which no local disease can be found and yet the patient is suffering from irregular bleeding; although in the case of young women it may be justifiable to try a short course of medicinal treatment first on the chance that the symptoms will be cured.

When the cervix is dilated, retained products of conception, polypi, small submucous fibroids, or malignant disease may be discovered; whilst in the absence of any evidence of such disease some mucous membrane can be removed for microscopical examination, when, especially in elderly women, early malignant disease or senile endometritis may be discovered, the latter being well treated by a thorough curetting.

The operation of curetting is generally regarded as easy and safe, though I have known operators of great experience fail to dilate the cervical canal, and be able to enlarge the internal os only by incising the cervix on each side until this appears in view. Safe the operation never is, and gynaecological surgeons, even of large experience, do not care much about performing it.

There are special accidents connected with each of the two parts of the operation which the operator, unless he is forewarned, may fail to detect. I will not discuss the risk of sepsis, though it is a very real one, since everyone who does any operating should have full knowledge of it. There remain laceration of the cervix, perforation of the uterus, and excessive bleeding.

To curette the uterus the cervix must be dilated. Before inserting the dilators it is necessary to know the exact position of the uterus; failure to recognize this has often led to perforation of the anterior wall of the uterus when the latter has been displaced backwards. Yet doctors quite frequently start the operation without making a bimanual examination or passing the uterine sound. The next danger is concerned with the dilatation of the cervix. It is probable that in all cases in which the cervical canal is dilated sufficiently to insert the index finger for purposes of diagnosis some of the muscle fibres in the neighbourhood of the internal os are lacerated. At times, however, owing to the rigidity of the tissue and the consequent employment of excessive force, or because of bad technique, the cervix is very badly lacerated. Excessive force can easily be avoided by holding the dilator with the thumb and first two fingers only and resting the wrist against the buttock of the patient. To seize hold of the dilator with the hand, and without any counter-pressure of the buttock, then to press the dilator forward with great force, at times leads to the internal os suddenly splitting, when, before the operator can control it, the end of the dilator shoots forward and the uterine wall is perforated. I have seen this happen more than once.

By bad technique I mean not being sure that each succeeding dilator is inserted at least through the internal os. If the internal os is difficult to dilate it may easily happen that the dilator used is not inserted as far as the previous one. If the operator is not paying particular attention, or is ignorant that such a thing is likely to occur, each succeeding dilator goes in a shorter and shorter distance; in fact, the cervical canal only is being dilated efficiently and not the internal os. When he has passed as many dilators as he thinks necessary the operator in ignorance curettes the cervical canal only; or alternatively, if the operator notices that there is an increasing difficulty in getting his dilators to pass through the internal os, he commences to use undue force. The result is that the muscle fibres in the neighbourhood of the internal os are lacerated, and the point of each succeeding dilator, instead of passing through the os, catches in this laceration and perforates the uterus, commonly into the broad ligament and more rarely into the utero-vesical pouch. In such circumstances the curette has been passed through the laceration and the tissue beyond curetted.

The cervix having been dilated successfully there still remains the danger of perforation. This accident is very likely to happen if the uterine wall is soft, as it is in pregnancy, and this, together with the risk of sepsis, is the reason why most authorities teach that the uterus should not be curetted for retained products in cases of very recent miscarriage. On the other hand, the uterine wall may be the seat of unsuspected malignant disease, into which the curette will sink as easily as it will into a pat of butter. If a flushing curette is being used some of the lotion may be delivered into the peritoneal cavity before the operator is aware of the accident, and fatal results have been reported in such circumstances; if, as should be the practice, a non-flushing curette is being used and the case is a clean one, as a rule the patient does quite well as long as the operation is stopped and a douche is not given. If the case is a septic one, pelvic cellulitis or peritonitis, as the case may be, may result, and I have known deaths in such circumstances. Perforation may also lead to intraperitoneal bleeding necessitating the removal of the uterus, of which I have seen one case.

Sometimes after curetting the bleeding is quite severe, especially in cases of retained products which are rightly curetted some time after miscarriage; in such cases the uterus should be packed. A graver form of haemorrhage occurs in severe laceration of the cervix when the uterine artery or an important branch thereof has been ruptured. In such cases sutures inserted through the lacerated cervix are usually sufficient to stop the bleeding; failing that the artery will have to be exposed and tied either by the vaginal or the abdominal route. More rarely the blood, instead of escaping externally, infiltrates the cellular tissue of the broad ligament, causing a large haematoma, which may spread upwards over the pelvic brim and necessitate the abdomen being opened.

Lastly, occasionally very serious bleeding happens about the tenth to the fourteenth day after the operation, and failure to recognize its cause may lead to a fatal result. It is due to sloughing of the uterine artery, or to the displacement of a thrombus in the torn artery following a severe laceration of the cervix. I have seen such cases in hospital practice, and on three occasions I have been asked to see similar cases in private. On the last occasion the patient was so bad that I had to remove the uterus immediately and resort to transfusion. In this case when the bleeding first started the uterus had been packed on the assumption that the blood was coming from the uterine cavity.

THE ARTIFICIAL TERMINATION OF PREGNANCY.

Women regard miscarriages or premature labours from different points of view. While some are heartily glad to be free of what they consider to be an incubus, others are so grieved that a serious mental effect may be produced, and if it be the only time they have been pregnant entirely alter their outlook on life. Apart, however, from the feelings of the patient or her husband, the medical attendant has certain things to consider. For instance, every year a certain number of deaths are asscciated with the artificial termination of pregnancy; moreover, such an operation may be followed by much misery from chronic disease of the uterus and its appendages. Further, the practitioner is depriving the nation of a potential citizen, and perhaps—who knows?—of a Shakespeare or a Newton.

There are many conditions in which pregnancy may legitimately be terminated forthwith and without any hesitation; these are for the most part rare, with the exception of molar pregnancy and severe toxaemia, and I do not intend to discuss them. Certain other conditions comprise the majority of cases in which pregnancy is prematurely terminated, and in many instances such a method of treatment is inadvisable or quite unwarranted. These conditions are: bleeding from the uterus, severe vomiting, and certain cases of albuminuria.

It is often very difficult to determine in the case of a pregnant woman who is bleeding whether to empty the uterus or not. Unless the bleeding is so severe that it causes marked symptoms and signs it is no indication that the pregnancy should be terminated, neither is the duration of the bleeding nor the colour of the blood escaping. I have vivid recollections of a patient who bled not a little for five consecutive weeks, commencing when she was four months pregnant. At the end of the five weeks the bleeding stopped, and after a further rest in bed for another ten days I allowed her to get up. The same afternoon, when walking from her bed to the sofa, she had a really furious haemorrhage which spoilt the sofa and carpet before she could be got back to bed. As she had previously had one Fallopian tube removed for a ruptured tubal gestation, when she nearly lost her life, and had subsequently not become pregnant for four years until she had been curetted for chronic endometritis, and as an heir was particularly desired and her husband was approaching 60 years of age, great pressure was brought to bear upon me to give her another chance. Beyond a somewhat free discharge for the next day or two nothing occurred, and at the end of another fortnight I again allowed the patient to get up, and subsequently delivered her at term, with no difficulty, of a child weighing 8 lb.

I feel confident that the uterus in a large number of pregnant patients is emptied because of bleeding when there is no need or justification. The doctor is not always to blame for this; many patients will not tolerate the proper treatment, or their circumstances will not allow them to follow it. Others, in their anxiety to get rid of the pregnancy, do not follow the treatment prescribed, and deliberately by various acts endeavour to hasten the evacuation of the uterus, whilst the patients of a third group or their relatives may be so alarmed at the bleeding and worry the doctor so much that in desperation he empties the uterus. Now unless the bleeding is really dangerous the doctor should be in no hurry to empty the uterus until he is satisfied, by the fact that the uterus is not normally increasing in size, that the ovum is dead. This may mean waiting for a month or more. Moreover, the fact that a discharge is brown in colour is no certain indication that the ovum is dead; such a colour may be due to the fact that the blood has been held up in the uterus, and if allowed to lie in the vagina it may even become offensive.

Of all the subterfuges women invent to get rid of their pregnancy, sickness is the commonest. Morning sickness, or, later in pregnancy, severe vomiting due to neurosis and not toxaemia, may be very difficult to treat, short of emptying the uterus. In such cases many a doctor has been driven to empty the uterus against his better judgement, either from the insistence of the patient or of her relatives, or because the patient refuses or cannot afford to follow the correct treatment. It behoves every doctor, therefore, to be very circumspect when he is faced by such a complication. In the first place, he must satisfy himself that the patient really is as sick as she says, and, secondly, whether the sickness is due to neurosis or to toxaemia. To give an example: I know of the case of a well educated woman in a very good position who, having had three children, was determined not to have a fourth. In due course, therefore, she commenced to complain of sickness and inability to take any food. That she took but little food at her meals was certain from the observation of those in her company, and that she was constantly being sick was evident from the noises she made and the contents of the receptacles into which she vomited. Her medical attendant never tested her urine, and at last, what with the worrying of the patient and her husband, became unduly alarmed and telephoned for a consultant, who hurried down to the patient and, without any examination of the urine, then and there emptied the uterus. Needless to say, the patient made a splendid recovery. Now as a fact, as reported to me some years later by a friend of hers, the patient had boasted to her how she had tricked the doctors by eating quite good meals in secret and later making herself sick by tickling the back of her throat.

If severe vomiting in pregnancy is not due to toxaemia—and in most cases it is not—it can be cured by placing the patient in an institution away from her friends, taking no notice of her refusal to eat, and supplying her regularly with three meals a day. Unfortunately all patients cannot afford to go into a nursing home, and some may refuse to go into the hospital, so that in the end pregnancy has to be terminated. The presence of albumin in the urine and other evidences of toxaemia is an indication that the vomiting is of the toxaemic type, and such indications will now be discussed.

ALBUMINURIA IN PREGNANCY.

It is the duty of every doctor to examine periodically the urine of his pregnant patients. By so doing the supervention of eclampsia, one of the most tragic complications of pregnancy or labour, may be avoided. There is also another aspect. Nowadays, what with the ante-natal clinics and the wider diffusion of knowledge generally, it is well known by others than members of the medical profession that the urine of pregnant women should be examined at repeated intervals. The neglect to do so, if eclampsia intervenes, may, as in the instance of a doctor friend of mine, land the practitioner in an action for damages for gross neglect, and sooner than face a public trial of such a nature he may have to pay a large sum to settle the matter.

With the modern biochemical methods of ascertaining the condition of the liver and kidneys at his command, either through the medium of hospital or private laboratories, the doctor has but little excuse if, having discovered albumin in a pregnant woman, he does not have such an examination made. A chemical examination of the blood and urine may be of the greatest value in preventing permanent damage to the patient and also of the greatest value to the doctor in showing him when it is advisable to terminate the pregnancy. Nowadays we do not rely on the amount of albumin and the general condition of the patient so much as on certain tests, which include (1) the estimation of the blood urea, (2) the urea concentration test.

Estimation of the Blood Urea.

Blood (10 c.cm. or even more) is taken from the patient and tested for the amount of urea it contains. Normally there is in a healthy pregnant woman about 20 mg. per 100 c.cm. If the urea content of the blood is definitely raised, say to 40 mg. per 100 c.cm., it is proof that the kidneys are severely damaged, and an indication that the labour should be terminated.

Urea Concentration Test.

The bladder having been emptied, 15 grams of urea dissolved in half a pint of water are given. One hour and two hours after this solution has been drunk the bladder is emptied and the amount of urea is estimated in each specimen. If the kidneys are normal the first specimen should contain at least 1.5 per cent. of urea, the second 2 per cent. If lower figures are obtained a renal lesion is to be suspected. Repetition of both estimations after an interval is invaluable, since a rising blood urea with a falling concentration capacity constitute an obvious indication of a progressive lesion.

PELVIC HAEMATOCELE: RETROVERTED GRAVID UTERUS.

An error of diagnosis, among the most serious I know of with respect to its immediate result, is that of mistaking a pelvic haematocele due to extrauterine gestation for a retroverted gravid uterus that is bleeding. I have met with this mistaken diagnosis many times, and have known it to lead to a fatal result.

If we consider the symptoms and signs of these conditions up to a point we need not be so astonished at such a mistake, since the condition may easily be confused unless a most careful investigation is made. In both these complications there may have been a period of amenorrhoea, for the rupture or abortion of a pregnant Fallopian tube does not usually take place before the sixth week of pregnancy, and

may occur as late as the twelfth week, whilst nausea, alteration in the breasts, and softening of the cervix, which are found in intrauterine pregnancy, may also be present in extrauterine pregnancy. In the case of rupture or abortion of a pregnant tube there is bleeding due to the separation of the decidua, whilst a threatened or inevitable miscarriage in a retroverted gravid uterus is not uncommon. In extrauterine gestation a decidual membrane may have been passed, whilst the ovum or part of it may be expelled by the retroverted gravid uterus. In the case of a ruptured or aborted pregnant tube the swelling in the pouch of Douglas is due to the blood which has escaped, whilst the body of the retroverted gravid uterus forms a somewhat similar swelling.

If, then, a case of pelvic haematocele presents itself to a practitioner he may wrongly assume that he has to deal with a case of retroverted gravid uterus that is bleeding, and he proceeds to treat the patient as follows; and I remember many examples of all three methods of treatment.

1. If the bleeding is not very much, he may endeavour to push up the supposed fundus of the uterus preparatory to inserting a ring pessary with the object of preventing the supposed miscarriage.
2. If the bleeding is severe, he may endeavour to empty the uterus.
3. If the bleeding is slight and continuous, and some substance has been passed, he may come to the conclusion that his patient, having miscarried, is suffering from subinvolution, and think it his duty to curette her.

But suppose the case is one of pelvic haematocele, what will be the result? In the first case he cannot push up the swelling with the ease to which he is accustomed, and, using greater force, still further ruptures the tube if it is already damaged, or ruptures it if it is aborting, and the woman becomes desperately ill from internal haemorrhage the cause of which he does not identify. In the second case, on dilating the cervix he is surprised to find the uterus empty, thinks she has miscarried, and as a result of his manipulations serious internal haemorrhage may be started. In the third case, if he does not start serious internal bleeding he will think he has curetted in vain, and the woman will still go on bleeding.

Such a mistake can be avoided by a careful consideration of the history and by a thorough and complete examination of the patient. No woman has a tubal rupture or abortion without very severe abdominal pain. As a rule the pain associated with a threatened or inevitable miscarriage is not very marked. Moreover, in those cases of miscarriage in which the pain is bad the bleeding is also marked, the pain being due to the contraction of the uterus as it separates the whole ovum. On the other hand, with extrauterine gestation the bleeding in practically all cases is slight, and yet the pain is very bad. Again, if the patient exhibits the classical symptoms and signs of bleeding, and the bleeding which can be seen is slight, why does she have such symptoms? She must be bleeding internally. However, even here one may meet with difficulty, because at times the bleeding goes on so slowly that the classical symptoms are a long time developing.

Lastly, we have an absolute means of diagnosis at our command. The cervix in a retroverted gravid uterus will be pointing forward—so far forward at times that it can scarcely be reached, and then only with the patient on her back. On the other hand, the cervix in extrauterine gestation is pointing backwards and the whole uterus is driven forward by the haematocele. Even this may escape notice, but where is the fundus of the uterus? The practitioner must make certain of this; if he cannot satisfy himself without putting the patient under an anaesthetic this must be done. A bimanual examination in the case of a retroverted gravid uterus will disclose the fact that the body of the uterus is absent from its normal position, and in the case of an extrauterine gestation that the body of the uterus can be grasped bimanually and that there is a further swelling in the pouch of Douglas. The correct diagnosis is made and perhaps a fatal error has been avoided.

CARCINOMA OF THE UTERUS.

Out of every hundred women who die during the year in England and Wales four die of cancer of the uterus. The uterus is by far the commonest seat of cancer in the female, and more women die of cancer than of consumption.

Without the slightest doubt cancer of the uterus can be cured. The reason why the vast majority of women thus afflicted die is because the disease is not diagnosed until it is too late to operate. Cancer of the uterus is quite easy to diagnose if the doctor uses all the resources at his hand and of which he is well aware. Therefore, if a doctor has been consulted, the fact that the disease remains undiagnosed cannot in any way be ascribed to ignorance.

Carcinoma of the cervix is, as a rule, quite easy to diagnose because the suspected part bleeds easily, and sometimes markedly, on being touched. On occasions a patient will present herself to the doctor in an early stage of the disease. He finds that the diseased area bleeds rather freely on being rubbed; so do some erosions; there is no apparent growth, and to his eye it looks like an erosion. He therefore treats her for months, and then, as the condition gets worse, sends the patient to hospital with a note that in spite of prolonged local treatment he cannot get the condition to heal. What should that doctor have done when he found the local condition bled so easily? He should have cut a wedge-shaped piece of the diseased area out of the cervix, including the muscle underneath as well as the surface epithelium, and had it examined by the microscope. This small operation is quite easy to perform, and the bleeding, such as it is, can be at once arrested by suturing the edges of the incision with a catgut suture. If afraid to do this, he might have tested the friability of the patch with a blunt probe or uterine sound.

The only symptom that the patient suffering from carcinoma of the body of the uterus may complain of is bleeding. The average age for carcinoma of the body of the uterus is 53—that is, about the time of, or soon after, the menopause. The cause of irregular bleeding from the cavity of the uterus can easily be determined by dilating the cervical canal and examining the interior of the uterus, when, unless the cancer is very early, its presence can at once be detected. Even if the case be very early, so that no friable patches are felt, a microscopical examination of the material obtained by curetting will give the diagnosis.

I am sure that all medical men know what I have just stated. Why do some of them not apply this knowledge? I cannot tell; I know only what I have been told. Patients are admitted into my wards at the Middlesex Hospital almost every month for cancer of the uterus too far advanced for operation. The notes taken out by the house surgeon state: "The patient has been bleeding for many months; she consulted a doctor, who did not examine her and told her the bleeding was due to the change of life." Again a patient is sent up to me with a note from a doctor that she has had irregular bleeding for some time, that he has given her drugs to no purpose, but he has not examined her because he would not know what he was feeling if he did. Perhaps he adds that he had never had any chance of examining patients vaginally when a student, and so has never felt equal to making a diagnosis in that region. The fact that an erosion of the cervix does not improve with local treatment and bleeds every time it is treated does not for a long while strike some doctors as peculiar.

Now I do not mean to assert for a moment that the blame can always be attributed to the doctor; on the contrary, I think in most cases the reason a diagnosis is not made sooner is because the patient does not seek advice sooner. Her reasons for this are threefold. Most commonly she attributes her irregular bleeding to the change of life, this opinion being supported by the views of her female friends and perhaps of those of some nurse or midwife; or she may object to an internal examination; or, lastly, she may think she has cancer and fears to have her thoughts confirmed. The unfortunate circumstance that irregular bleeding may occur at the menopause without any disease of the uterus is indirectly responsible for the death of hundreds of women every year. When irregular or excessive bleeding does occur, however, there is always an interval, of longer or shorter duration, in which there is no bleeding. The lesson to be learnt, then, is that any unusual bleeding, and especially about the time of the menopause, should always be investigated by a thorough internal examination.

By the radical operation cancer of the cervix can be treated at a very much later stage than by any other procedure. I have taken out the cancer figures at the Middlesex Hospital for the last fifteen years, and I find that I have operated upon over 40 per cent. of those admitted. Most of these were advanced cases, and the disease could not have been removed by any other method. Even with such a handicap my absolute cure percentage—that is, freedom from recurrence for five years—is over 30. I leave you to form your own conclusions as to the results that might be obtained if one could only get these cases in an early stage. The importance of the early diagnosis of cancer of the uterus should be strongly impressed upon nurses and midwives. At the Middlesex

Hospital we have leaflets for distribution to female patients containing in simple language the most important facts concerning this fearful scourge.

POST-MATURITY.

It must have happened to everyone who has practised midwifery that on occasions he has had a patient who, by the usual methods of reckoning, has gone beyond term. Such an event not only causes worry to the patient and her relatives, and additional expense because of the nurse, but it may also be a source of much anxiety to the doctor, who in the end has perhaps to attend a difficult labour, followed in many instances by death of the child. The following points are of interest[1]:

1. Post-maturity may be recognized by the presence in the child of excessive length, weight, ossification, and an easy separability of its dura mater.

2. It is probable that spermatozoa cannot live longer in the genital canal than ten days.

3. Although the time between the first day of the last menstruation and delivery, and that of insemination and delivery, can be calculated, that between impregnation or fecundation and delivery cannot within ten days.

4. There are undoubted dangers both to the mother and the child when pregnancy is prolonged beyond its normal time. These dangers are mostly concerned with the difficulty in the passage of the child.

The correct treatment when the practitioner thinks that the child is post-mature is to induce labour. How is he to arrive at such a diagnosis?

1. By noting any prolongation of pregnancy beyond the expected date of delivery, as calculated from the first day of the last period.

2. By a careful ante-natal supervision of his patients, noticing particularly, in the absence of uterine contraction, the ease with which the head of the foetus is passing into the pelvis in a primigravida or can be pressed into the pelvis in a multipara.

3. If an allowance of ten days be made over and above the date selected for the day of delivery it may safely be assumed that after this the pregnancy is post mature, due regard being paid to the relation of the foetal head to the mother's pelvis.

4. With this information, therefore, the doctor may justifiably induce labour 290 days after the first day of the last menstruation, and, indeed, many authorities think that he should do so.

HOT-WATER BOTTLES.

Burns from hot-water bottles are not as uncommon as one would think. The late Dr. F. J. Smith stated that he knew personally of 80 cases.

As a working rule never allow a hot-water bottle to be placed in the bed of a patient recovering from an anaesthetic, not even if it is surrounded with blankets, because in such a case the patient may be restless and kick the blanket off, when the exposed hot-water bottle may burn her. If, however, it is considered essential, because of shock, to place protected hot-water bottles in the bed, a nurse should be directed to stay by the side of the patient until she has completely regained consciousness to ensure that she is not burnt. When such precautions have not been exercised, burns may result which take months to heal and then only with dreadful scarring.

I introduce this subject to warn you that even with this knowledge you may be let down owing to the carelessness or disobedience of the nurse.

A friend of mine operated upon a patient. The operation was a very severe one, and he deemed it necessary to give her an intravenous infusion, and as he could not expose the vein in one arm he had to cut down on a vein in the other. The patient, who was in a nursing home, was put back to bed and was frightfully burnt on one buttock and foot with hot-water bottles. Neither the patient nor her husband appears to have been very inquisitive, and the doctor, therefore, did not feel called upon to discuss with them the exact state of affairs. At the end of fourteen weeks the husband said, "Don't you think that those wounds you made on the buttock and leg, which have been so septic, would heal better at my own home?" My friend then discovered that the owner of the nursing home had told the husband that the surgeon had made wounds on both arms and in two places on the leg to inject saline into the veins, and that the wounds on the buttock and leg were larger because the blood vessels could not be found. This was more than my friend could stand, with the result that when the husband was enlightened he refused to pay the expenses of the nursing home. The owner of the home then brought an action to recover the money; the husband brought a counter-action for damages, and the matter was settled out of court, the husband being paid £500 and costs.

I remember the case of a lady from whom I removed with the greatest difficulty a very adherent ovarian cyst. There was some very free oozing from the raw surfaces left, and no bleeding point could be secured. I therefore had recourse to the method of temporarily packing the pelvis with swabs wrung out of boiling water. Three days later I visited this patient in the absence of the doctor and with his consent, and discovered to my horror that her buttock and leg had been frightfully burnt with hot-water bottles. The nurse, of course, had to own up, but begged me not to tell the doctor, saying that he might not employ her again if she did not tell him herself. Foolishly I agreed. I heard nothing more of the patient at the time, and was a little disappointed that the doctor had not written to me, because the operation as a surgical exercise was a great success, and it was the first time this particular doctor had given me a case. Some years later a relative of the patient consulted me; told me that her relative's leg was frightfully scarred. Expressing surprise and inquiring how this accident had arisen, the answer was, "Why, don't you remember, it was due to your pouring all that boiling water over her." I asked who said this, and was told the nurses. I then had no hesitation in telling her the true facts. Naturally I at once wrote off to the doctor, from whom I had never heard again, and he replied that the nurses had told the patient that I had had to use boiling water to stop the bleeding, and when wringing out the swabs had spilt the water all down her side. Further, the doctor was kind enough to add that he had thought it wiser to let the blame rest on me because I could be excused in an endeavour to save the patient's life, whereas the nurse could not be excused, and the husband, if he had known the true facts, would have been certain to have brought an action for damages against the nurse; and he, the doctor, hated law suits!

REFERENCE.

[1] Ballantyne, J. W., and Browne, F. J.: The Problems of Foetal Post-maturity and Prolongation of Labour, *Journ. of Obstet. and Gynaecol. of the British Empire*, 1922, vol. 29, No. 2, p. 177.

THE DIAGNOSIS OF INDEFINITE MASSES IN THE BREAST.*

BY

DUNCAN C. L. FITZWILLIAMS, C.M.G., CH.M., F.R.C.S.,

SURGEON, ST. MARY'S HOSPITAL, LONDON.

THE diagnosis of small indefinite masses in the breast presents such peculiar difficulties to the medical man, right diagnosis carries with it such advantages, and wrong diagnosis or unnecessary delay such awful penalties to the patient, that the subject is well worthy of consideration.

In early cases of lumps in the breast it is curious, but true, that though the question, Is it a new growth or is it an inflammatory mass? always arises in one's mind, the smaller the mass is the more one is inclined to put it down as inflammatory. Malignancy is associated in our minds with something sinister and threatening. A small and apparently harmless mass is acquitted merely on account of its small size. This is of course quite wrong; malignant growths must all begin small, and then is the right and most favourable moment for their extirpation; that, indeed, may be the only time at which a cure can be guaranteed. But how many small malignant growths do we operate upon, and how many large ones? The proportion is not more than one in six.

It is widely recognized that if carcinoma is removed early, especially in an organ like the breast, where such a large part of the lymph field is easily accessible, the very best results may be achieved. The difficulty is to decide what is early removal, and how it is to be effected. That difficulty I wish chiefly to deal with.

At the same time it must be recognized that we are not dealing with the constant factor of a machine, but with the vagaries of human nature, with those peculiarities of the human mind, with those prejudices inborn centuries ago, and those leanings which we can only explain by saying that they are second nature. We have all heard of cancer cures—the violet-leaf cure, the cure by turpentine, and by escharotic paste, not to mention some of the older ones; then lately *x* rays, then radium, then selenium, and now back again to *x* rays, and larger and more expensive instruments. Wait! these will go like their predecessors, and will be succeeded by some treatment just as effective or ineffective as you may be pleased to term it. Explanations are useless. Each of these methods not only claims its cures, but each can, I know, produce them; people live after each of these treatments for ten, fifteen, and twenty years in the case of the older methods, and the modern methods and future ones will, I am quite sure, afford similar instances. Each holds out just sufficient encouragement to lure on and, I am afraid, to delude the practitioner into thinking that at last the cure is about to be discovered.

Investigations and experiments should and must continue; I should be the last to decry them. But we, as a profession,

* A paper read before the Chelsea Clinical Society.

are so prone to rush after every goose long before it flies, crying out so loudly that it is a swan, that a note of warning must be sounded. We are only yet at that stage where, alas! in the vast majority of cases it is the knife, and only the knife, on which we can rely with any certainty. That is the only method upon which we have relied for the last two hundred years. All other methods change constantly; each is said to be successful—why does it fall into disrepute? I think perhaps its success may possibly be fanciful, and due not to the cure, but to the well recognized vagaries of the disease. I believe the same thing will happen with the methods now employed.

Why is it that human nature, especially female nature, fears the knife? You may use an écraseur or a cautery, if you like, to do an incomplete operation, but a complete and clean one by the knife is often objected to; and yet for every case receiving benefit by any other means a hundred receive it from the knife. Again, why is it that the knife is refused in early cases, when it is most useful, and resorted to after the waste of so much time that its success is a matter of conjecture? Why is it that human nature prefers a cure by some unorthodox means? Why is it that Naaman the Syrian was wroth and wished Elisha "to come out and strike his hand over the place and recover the leper," instead of doing what the man he had come so far to see told him to do? Human nature is the same to-day as it was then—it still craves for novelty.

In dealing with tumours perhaps it is not recognized sufficiently clearly that the vast majority are malignant. It is computed that 80 to 85 per cent. of tumours of the breast are malignant, and at most 15 to 20 per cent. are innocent, or innocent in their early stages. I do not think that these figures are entirely accurate, as they are collected from records, and it must be obvious that many small and apparently innocent lumps such as we deal with in the out-patient department will have no records at all. But still, if we take 70 per cent. malignant and 30 per cent. innocent we shall be within the true figures.

That means that a lump in the breast, however small, is more than twice as likely to be malignant as it is to be innocent. This is a point which needs emphasis to bring it home to us. It is one of the most difficult things in practice to imagine that a lump, however small, is twice as likely to be malignant as innocent; we are always ready to acquit it on size alone. Then one must bear in mind that there are a large number of cases which we admit are innocent to begin with, but which later take on malignant characters. They do this in two ways—either the character of the growth changes and becomes malignant, or a malignant growth starts in part of a purely innocent growth, such as a cyst wall. To begin with these must obviously have all the symptoms and characters of innocency.

Now if I ask, What is the difference in character between an innocent and malignant growth? you will at once begin to say adherence to the skin, to the deeper structures, glands in the axilla, retraction of and perhaps discharge from the nipple, shrinkage of the organ, etc.—these are the characters with which we associate malignancy, and the absence of these characters denote innocency. The presence or absence of a tumour felt with the flat of the hand, which used to be, and is even now, so insisted upon, is of course quite fallacious. A large malignant growth will of course be felt, but an early and a small one will be just as imperceptible as a chronic mastitis, in which indeed it is very often embedded. I do not, however, intend to go into these characteristics, but rather to deal with the subject in a different manner and ask, What is the meaning of all these characters that we take to be malignant? Is it really true that absence of these characteristics veritably denotes innocency? and we realize at once that the answer is "No." After a moment's reflection we realize that these characteristics denote nothing more than spread, and, pursuing this matter to its more logical conclusion, spread means that much time has been lost before a diagnosis has been made. To extirpate a growth we have to go outside all areas of spread—that is admitted. Why, then, do we wait deliberately till spread has occurred before we arrive at a diagnosis?

I now invite you to accompany me in imagination to the out-patient department. A healthy-looking woman of 50 complains of a lump in the breast which her doctor has seen six months previously and told her was nothing. She now shows a breast with scirrhus written large across it. There is a temptation to abuse the doctor for not sending her to the surgeon for advice sooner, and I have even heard very severe comments made upon such behaviour to the students. But wait—the very next case which comes up is a woman of the same age who says she has shown her doctor something in her breast, and he has sent her up for advice. On examination there is a small indefinite mass, not adherent to the skin or underlying structures, lying far from the nipple, so that there is no suspicion of retraction, there are no glands in the axilla, there is nothing to point to any cause whatever. On you now rests the responsibility. What are you going to advise? It is often extremely difficult to refrain from giving much the same advice as the doctor you were quite ready to blame a moment ago. You might quite well say, "This is nothing, my good woman, do not worry your mind about it; just come up and see me in a month's time," and think you were justified in doing so. Two or three months may pass without any very obvious change, and then the woman might neglect to come, thinking that it was not very important, as no operation was suggested—for to her an operation is the only important association she has with a lump—and that she need bother no further. Four, six, or eight months might quite well elapse before you see her again, and then the diagnosis may be as easy as in the first case we supposed. Spread has been going on slowly all the time, and the comments you were ready to pass on others may be as justly applied to yourself. You missed the opportunity offered you the first time of carrying out an investigation which would have placed the matter beyond the region of doubt at a time when, if it proved to be malignant, success was almost certain, while now, six to eight months later, it is very problematical.

But while making every excuse for the doctor who has failed to make certain in the early and doubtful stages through which every malignant growth must pass, there are certain cases we all know in which blame may rightly attach to the medical man. There is the careless man, always in a hurry, who never makes a thorough examination—you cannot alter him. Then there is the stage through which we all naturally pass, of non-experience, that rights itself with time. And lastly, and worse than all, there is the too fussy man who knows everything—he alone can assure the patient that "it is nothing." He, curiously enough, is almost always believed implicitly; perhaps the patient wants to believe him. If any doubt is raised he will put in a hypodermic needle, and if he succeeds in drawing off some clear fluid from a mastitic cyst will say, "Now what did I tell you? It is just a fluid cyst." I might here say that the use of a hypodermic needle or simple puncture is a most misleading and useless procedure. There is, lastly, our teaching, which is grievously at fault in this matter, as it does not sufficiently lay stress on the necessity for an immediate and thorough investigation.

Let it be clearly stated at once that no one has any right to tell a patient that a lump which has no characteristic at all is nothing; no one can tell. But yet the procedure I have laid before you from one cause or another is that almost universally adopted in practice.

We know that malignant disease must start in a small area, and yet how many cases are operated upon before anyone of any experience can diagnose them! By the time they can be diagnosed with certainty they are no longer to be considered early cases: they have spread to such an extent that they are now characteristic of the disease. These should be classed as advanced cases in which it should clearly be understood the prognosis has become grave. We do stumble on early cases sometimes, it is true, but the gospel of immediate investigation has yet to be preached a long time before it will be generally accepted. It is rational, it is right, it is only fair to the patient, and it will be generally accepted some day. The other day I came across an old-fashioned physician who advised against an operation for well marked recurrent appendicitis because "the last attack was only a mild one." That advice is now the exception, but twenty years ago it was the rule. We are still in this old-fashioned stage with regard to diseases of the breast.

Now, what can we do in early cases? We may as well confess at once that by the ordinary methods of inspection, palpation, etc., we can get no farther—we cannot, in fact, make a diagnosis. We can only say that there are as yet no characteristic features of malignancy; but if we are not to sit down calmly and deliberately and wait for these features to develop under our noses we must do something more. The probabilities are, in sporting parlance, something between two and three to one that the mass is malignant; that alone should urge us forward.

What are the innocent masses, adenomata, cysts, chronic

mastitis from whatever causes, tubercle, lipoma, gumma, hydatid?—we need go no farther into the rarities. Which of these are important? Adenomata, which have a very typical and definite feel however small, occur in young subjects, and are nearly always removed at once when diagnosed; they offer very little trouble.

Deeply seated lipomata, gummata, and hydatids may be placed aside too, for all practical purposes, for they are rare and still more rarely diagnosed. Tubercle, also, unless it is advanced, or has ulcerated, is much more often diagnosed by the microscope than by any other means. There remains, therefore, that large group of cysts, and chronic mastitis, and involution masses. These arise in the same period of life as malignancy develops. In the early stages they have the same lack of characteristics as early carcinoma. They may cause more pain, but not always. Do what we will, the microscope is the only method of distinguishing between these classes.

I think it should be pointed out to every patient over 30, and certainly to everyone over 35, that the microscope is the only method we have at our disposal of arriving at a diagnosis without losing so much time as to render the outlook exceedingly grave if a growth should prove to be malignant.

Perhaps I should add here a note of warning about the danger of acquitting a tumour on no other grounds than that of the age of the patient. I know of two cases of cancer of the breast which occurred under 12 years of age, and many which occurred in the teens. Rodman collected 5,000 cases, of which nearly 10 per cent. were under 30 years of age. These facts alone will show you that you are acquitting a very doubtful tumour on very inadequate evidence.

How is the investigation to be carried out? We do not want to cause more disfigurement than is necessary. Luckily what is necessary can easily be done without leaving any visible scar. The operation is associated with the names of Dr. Thomas and Dr. Collins Warren of Boston. It consists in making a sweeping incision in the circumference of the breast below and to its outer side. The incision extends nearly half-way round the breast, and goes right down to the muscles. The breast is then lifted up so as to expose its deep surface. The deep surface even of the upper part of the breast can thus be brought into view. A wedge-shaped portion of the breast is then removed, containing the suspicious mass in its centre. The wound can then be closed. Once free of the body the mass may be cut into and inspected. Often this gives most valuable information, though it should also be borne in mind that the knowledge thus gained may be misleading, as the cases quoted below prove only too well.

If one can arrange to have a pathologist with a freezing microtome waiting to cut a section this may be done, and the microscopical examination made there and then in the course of a few minutes. The surgeon can be told, with a fair amount of certainty, whether he has done all that is needed, or whether he should proceed to do the complete operation.

As a rule it is only in hospital that we have the advantage of a pathologist upon the spot, most of us being content to wait the verdict after a lapse of some days, and then if necessary perform a second operation. There are pros and cons for both ways, as I have known the freezing microtome give a wrong diagnosis, simply because in the hurry the wrong piece of tissue had been frozen and cut, or the section had not traversed the growth. To me the more methodical examination conducted in the laboratory seems the safer of the two, especially if the raw surface is seared with the cautery, or the lump cut out by this means so as to close the ends of the lymphatics.

It matters not which plan is adopted, so long as this method of diagnosis and treatment is urged on the patient, and it is explained to her that the responsibility for delay rests solely with herself, for her medical man can give her no further help in the matter. Delay is the method relied upon heretofore; it should now be discarded. Delay means spread and the development of characteristic signs, but at what a price! The needed information can be obtained with certainty within a few days by the operative means.

The following cases illustrate the method; many others might be quoted.

CASE I.

A lady, aged 50, seen in private, had noticed a small lump in her left breast for some two months. There was no pain. As the lump did not go away she had come for advice. Examination showed a small indefinite mass or ill-defined thickening, hardly a lump, deeply placed in the upper and outer quadrant of the breast. It was hardly perceptible to the flat hand as the patient was well developed. There were no signs or symptoms of malignancy, and no glands to be felt. She was advised to have it investigated. It was removed by circumferential incision. To the naked eye it looked doubtful. It was sent to the pathologist, who returned a verdict of carcinoma. A complete operation was performed after the lapse of a week. There has been no sign of a recurrence since.

The following cases show that the method must be carried out systematically and carefully, and that no reliance whatsoever must be placed upon examination by the naked eye. This last truth I find personally is very difficult to learn. The difficulty of diagnosing the true nature of the mass by any other means than by microscopical examination is illustrated by Case II.

CASE II.

A lady, aged 54, under the care of Dr. Fiddes, was seen on November 8th, 1920. About a month previously she had noticed a small lump in her right breast which had caused a small amount of pain on stretching and reaching with her arm. There was nothing of importance in her family or previous history.

A very small but indefinite mass, deeply placed, about the size of a date, was detected just outside the nipple. The skin was free but the mass was incorporated in the breast. There was no discharge from the nipple. The nipple was attached to the mass and appeared slightly retracted; this, however, she denied, and said that the nipple had always been like that. There was one small gland in the axilla. The diagnosis lay between a cyst and early scirrhus.

The same procedure above advocated was advised, and in November the mass was removed. It seemed quite obvious to the naked eye that it was a simple mastitis, but it was sent to the pathologist. In the meanwhile the friends were told that it was probably quite simple and were reassured. A few days later the pathologist reported that the mass was a carcinoma of the ordinary scirrhous type. The patient had to be told, and a radical operation was performed. There has been no sign of a recurrence.

However awkward it may be to tell the patient disagreeable truth, after having assured her that the mass was to all intents and purposes a simple condition, the gain in having got the condition so early amply compensates for the unpleasantness. It, however, illustrates how unreliable is an examination by the naked eye.

CASE III.

A single woman of 45 was sent by Dr. Kellett to see me in 1911, with what was obviously a chronic interstitial mastitis of the involution type and cystic in character. There was such pain that she wished to have the mass removed. The whole breast was removed by the circumferential incision, the nipple being left. It was a mass of involution cysts and mastitis. A portion was sent to the pathologist; this portion, however, was innocent. I did not see her until 1912, when she said that seven months previously she had noticed a tiny nodule in the region of the scar, and later others came, but she took no notice of them as they were some distance from the scar. She had only gone to her doctor again the night before. Her condition now was as follows: There was a ring of small nodules varying from the size of a wheat grain to that of a pea, about nine in number, all situated about two and a half to three inches from the nipple, mostly to the upper and outer side of the breast. They were obviously secondary growths. A complete operation was then performed and a large area of skin had of course to be removed, the deficiency being made up by sliding in skin from the back. The pathological examination showed them to be carcinomata, and as the whole breast had been removed they were obviously secondary to a primary focus in the removed breast. The patient was seen this year with no signs of recurrence.

In this instance a small part only of what had been removed was sent to the pathologist, and this portion did not contain any malignant tissue.

This was one of my earlier cases, and since that time I have always been careful to send to the pathologist the whole mass as it has been removed.

The last case I wish to quote illustrates how one may be misled by naked-eye appearances in just the opposite direction and mistake a simple tumour for a malignant one.

CASE IV.

A Russian lady, aged 42, seen in private last year, said she had noticed a small lump in her left breast for twenty years, but it had now started to grow larger; she thought there was one coming in the right breast.

There was an ill-defined mass in the left breast in the upper and outer quadrant. There was no pain. It could be felt with the flat hand, though the breasts were large. The skin was distinctly attached to the mass, but the nipple seemed free. In the right breast was a similar but smaller mass just above the nipple, and here again the skin was drawn down and did not move so freely. There were glands in both axillae. On account of the history that she had had the lump in the left breast for twenty years a diagnosis of old mastitis was made, but at the same time she was urged to have the mass removed. She consented.

At the operation the breast was turned up and a portion radiating from the nipple was removed. On cutting this open a small area a little larger than an almond, but with an irregular outline, was found surrounded by mastitis. This area was grey and presented

every appearance of being malignant. It cut like an unripe pear; it retracted and hollowed on section; on scraping with the knife it gave the well known "cry of a cancer." Cancer I thought it to be, and proceeded to do a radical operation.

The mass was sent to the pathologist, and the husband was told what we had found, what we feared, and what had been done. He was also informed that the other breast would have to be treated in the same way.

There was a delay in receiving the report from the pathologist, but as the case was so obvious one did not give the matter a second thought. What was my surprise, therefore, the evening before the second operation had been arranged for, to get word from the pathologist that the mass was an old fibro-adenoma. The news was at once communicated to the patient and her friends. The next day a circumferential incision was made and the growth removed from the remaining breast. On cutting this across, exactly the same typical carcinomatous appearance presented itself. An experienced surgeon of high standing who was present gave it as his opinion that the mass was undoubtedly carcinoma, although I had purposely told him my previous mistake. We were now in a quandary; there was this tissue in my hand presenting to the eye every known appearance of carcinoma. Should we perform a radical operation or be content with the partial one, relying on the experience we had gained from the other breast? Would we get the same verdict from the pathologist as in the other breast? We had promised the patient that we were only going to do quite a partial operation. Should we have to come later and inform her that the pathologist's report required us to do a larger one? It was a very difficult position. I decided to close my eyes to the naked-eye appearances, to shut my ears to the surgical advice of our friend, and be content with a partial operation.

Fortunately, the pathologist returned again the same verdict as in the case of the other breast—that it was an old fibro-adenoma.

These cases have been quoted to show that, though radical investigation must be urged on patients at an early stage, there are yet many pitfalls for the unwary, and the very greatest care is necessary to arrive at a correct diagnosis.

MINOR TRAUMATIC DISABILITIES OF THE UPPER LIMB.*

BY

P. JENNER VERRALL, F.R.C.S.,

SURGEON, MINISTRY OF PENSIONS HOSPITAL, SHEPHERD'S BUSH; CHIEF ASSISTANT, ORTHOPAEDIC DEPARTMENT, ST. BARTHOLOMEW'S HOSPITAL.

I HAVE used the word "minor" to exclude fractures, dislocations, and gross lesions of the vessels and nerves, but in a way it is a misnomer, as the disability caused by a fracture or a dislocation, though more complete at the time, is often more easily repaired, and as it is regarded by both patient and practitioner in a more serious light more care is taken in the after-treatment and re-education of the limb in order to ensure a perfect result. The greater disability caused by comparatively minor lesions of the upper limb as compared with similar lesions of the lower limb is, to my mind, explicable by the finer adjustment of the neuro-muscular mechanism and more sensitive connexion between brain and periphery found in the former. Unless we are professional dancers or something akin, we do not ask our legs to perform very intricate movements, and the sensation is not so acute. We are content if our legs will bear our weight and carry us along. Good evidence of this sensibility is seen in the behaviour of amputation stumps. It is quite rare to find in leg stumps what we call "pain of central origin," whereas an upper arm stump is frequently the seat of great pain, for which no local cause can be found, and on which no artificial limb has ever been worn. Bulbous nerve ends may have been excised again and again, even up to the plexus above the clavicle, and yet the pain continues. Even posterior root section often fails to relieve the pain, proving conclusively that the pain is of central origin, and a very long period must elapse before the cortical cells give up their hopeless struggle for activity. The only hope lies in active occupation of mind and body, thus diverting the nervous impulses into new channels and relieving the tension in the now useless mechanism.

I desire to call attention to the extreme importance of the presence of septic foci in other parts of the body in the conversion of a minor strain into an intractable disability. As common septic sources I would put in order of frequency the teeth (root absorption, abscess, and generalized pyorrhoea), the tonsils (especially in younger subjects), the colon (chronic colon bacillus infection), the uterus or prostate, and the nasal sinuses. Unless these sources of infection are cleared up the treatment of a minor lesion may prove wellnigh impossible. When these underlying causes have been excluded, the question of diagnosis turns on, first, the history of the injury—that is to say, the precise action that the patient was performing at the time symptoms first appeared; secondly, a diligent search for a spot tender on pressure; with these must be combined accurate knowledge of the structures underlying that spot; thirdly, the limb must be put systematically through its normal movements in order, noting by which of them pain is produced and whether or no pressure on the tender spot during the performance of these movements relieves the pain or not.

The vast majority of minor traumatic disabilities in the shoulder region are due to adhesions in or around the joint, the movements most frequently affected being those of abduction and external rotation. The shoulder is a simple joint, unstable in itself, and depending for its stability with the help of its own ligaments on the interaction of a complicated musculature surrounding it; its capsule is weak in all parts and actually lax beneath the joint at the apex of the axilla. Acute simple traumatic bursitis of the subdeltoid bursa is a condition described in the textbooks and frequently diagnosed, owing to the fact that tenderness is elicited below the end of the acromion process, but in my opinion it only rarely occurs. The source of trouble is much more frequently either strain of a muscular attachment or adhesions. With other more serious forms of subdeltoid bursitis we are of course familiar—such as tuberculous, gouty, or calcareous bursitis—and I would regard definite swelling in the situation of the subdeltoid bursa as an indication for taking a more serious view of the case, or at any rate for obtaining a skiagram of the shoulder.

As to adhesions, we must understand how these come about and how they can be diagnosed. We will assume that there is no clinical sign of a gross lesion and that the skiagram (if one has been taken) shows a normal joint. First we must exclude active arthritis, which may be present although the skiagram shows a normal joint. Pain and limitation of movement in all directions indicate arthritis. Sir Robert Jones expresses the matter well when he says that if there is limitation of movement in all directions there is probably arthritis; if even one movement is free there is probably none.[1] The point is important, as the treatment of the two conditions is diametrically opposed—rest for active arthritis, movement for adhesions. Adhesions commonly give rise to pain and limitation of movement in one or more directions, but not in all, and come on fairly soon after the accident. Sir Robert Jones also calls attention to a condition which he terms "contusion of joint cartilage," such as may occur from a fall on the outstretched hand, pain and limitation of movement coming on gradually about a fortnight after the injury and being due to a process of repair in the damaged and bruised cartilage during which there is vascularization of the injured area. We have here the phenomena of an aseptic inflammation, and the treatment is determined by this. If due rest be given, the symptoms clear up, but if movement be allowed or forced at this stage, the recovering cartilage is further injured and recovery is delayed. However, the later history of such cases may well be that of "adhesions." As long as there are visual signs of active inflammation in the neighbourhood and of a definite arthritis, so long must we employ rest and soothing applications. When, however, this stage has passed we may allow movement without forcing it—that is to say, active movement, but not passive. Passive movement, apart from the full mobilization of a joint under an anaesthetic, is of very limited utility, and the temptation to employ it, although very great, should be firmly resisted. This applies to all joints. Assisted active movement should commonly take the place of true passive movement in the treatment of all joint lesions. If active movement is allowed and inflammation has passed, the movement of the joint should steadily increase in range. If it does not and the range begins to lessen, inflammation is still present and a further period of rest is indicated. If the range increases steadily with active use of the joint, let well alone. If it remains stationary, especially if the limitation of movement is in one or two directions only, the joint should be mobilized under an anaesthetic. It is commonly said that gas does not give sufficient muscular relaxation, but I maintain that with gas properly administered adequate relaxation can be obtained for the mobilization of all joints, with the possible exception of the hip. Under the anaesthetic all the normal movements of the joint should be carried through to the full extent,

* Abridged from an address delivered to the annual meeting of the Essex Division of the British Medical Association July, 1922.

systematically and in order, and care should be taken to control both sides of the joint and to protect bones from fracture—by splinting if necessary. Active controlled exercises and massage should follow either on the same day or on the next day if much trauma to the joint has been produced by the operation. The correct principles of mobilization are not new, and are well recognized by orthopaedic surgeons, but are less well recognized by others, and failure to realize them permits patients to have recourse to less orthodox ways in order to obtain correct treatment. There is one more condition which, to the best of my knowledge, has not previously been described, but is not very rare. Owing to long continued strain of the arm in a person unaccustomed to great exertion, abduction of the shoulder becomes limited in extent when an attempt is made to perform it with the arm in the coronal plane. If, however, the arm is brought forward, a painful snap is felt (or even heard) over the front of the joint, and the arm can then be freely abducted. I have recently been investigating this condition, and ascribe it to a slipping to and fro of the short tendon of the biceps over the lesser tuberosity of the humerus and the subscapularis tendon, which immediately underlie it. I thought that possibly there might be a bursa in this situation, but I have examined some twenty subjects in the dissecting room and have found no trace of a bursa. I think the condition is purely mechanical, and the results of treatment confirm this view; ordinary treatment fails entirely to produce a cure, but if the elbow be flexed and the arm brought well forward by a sling so as to relax the biceps, and a pad be strapped in place over the short tendon of the biceps just exterior to the coracoid process, cure is certain in two to three weeks.

It is in the elbow that we find the commonest injuries. Golf, tennis, and cricket have each of them their characteristic strains. Flexors and pronators from the inner condyle, extensors and supinators from the outer, are liable to strain in turn, and it is the key to comprehension of these injuries to realize that excessive tension of a muscle is felt at its origin no less than at its insertion. The pathology of such injuries is usually as follows: a few fibres are torn off from their bony origin, the periosteum is raised, and there is haemorrhage both subperiosteally and into the interstices of the muscle fibres with all the ensuing phenomena of inflammation and fibrous tissue formation, possibly aggravated, as I have already mentioned, by the presence of some septic focus elsewhere in the body. In addition to these muscular lesions the elbow-joint or superior radio-ulnar joint may be the seat of traumatic arthritis, or of adhesions; the diagnosis and treatment are on the same lines as those already indicated for the shoulder.

The commonest muscle to be injured is the flexor carpi ulnaris. Although a flexor of the wrist the most important action of this muscle is a restraining one, preventing undue abduction of the hand, and it is commonly injured in returning forehand a hard drive at tennis or in removing a large and rocky divot from the ground at golf. Pain is felt over the inner condyle at the time, but the game can usually be finished, and it is not until evening that the arm stiffens—that is to say, not until the haemorrhagic infiltration of the injured area is considerable. If immediate treatment be applied cure is usually rapid, but this is rarely possible, as we are not consulted soon enough. If opportunity occurs, a firm pad placed over the injured spot and strapped on will limit effusion and immobilize the muscle. The arm should be rested in a sling, if possible. Massage at this stage is unnecessary and may do harm.

The common tennis elbow is usually caused by a back-hand stroke. Its onset is similar to that of strain of the flexor carpi ulnaris, and pain is felt over the origins of the brachio-radialis and radial extensors. The exact pathology of this lesion has long been in doubt. Probably in the majority of cases it is due, like other similar accidents, to muscle rupture, and can be treated as such; but in April, 1921, Osgood[2] of Boston described his own personal experience and gave a review of the literature, which is very instructive. After describing the mode of onset he notes the common symptoms of a sudden unexpected sensation of weakness and pain running down the forearm, leading the patient to drop objects; he notes also that the pain and the tenderness differ in severity with different positions of the forearm; but this is to be expected whatever the causation. The same applies to the slight swelling and increased feeling of elasticity, which he also mentions. *X*-ray appearances are negative, as was to be expected. He gives the various theories of etiology that have been advanced: (1) tearing of muscular origins; (2) periosteal injury and periostitis; (3) post-influenzal periostitis; (4) injury to radio-humeral capsule; (5) arthritis of the radio-humeral joint. Unquestionably all of these occur and are responsible for the symptoms in certain cases; in my opinion the first two are those commonly to blame. He goes on to describe his own condition, which I have not seen, or at any rate have not verified, but which is well worthy of attention. He was treated in the usual way without permanent benefit. Dissection was made to see if a bursa were commonly present in this situation, and such a bursa was found beneath the conjoined tendon over the radio-humeral joint. An operation was performed on him under local anaesthesia, and an extremely sensitive area was found with outlines of a dirty greyish-white, but with no distinct sac. This was removed and found to be chronic inflammatory tissue. This operation cured him, and subsequent dissection showed the bursa present in seven consecutive elbows examined.

Dr. Osgood has performed a very useful service in calling attention to the presence of this bursa and its tendency to inflammation; but we frequently meet with inflamed bursae, and it is not always necessary to dissect them out. If we make use of appropriate non-operative methods, and pay attention to the possibility of septic foci elsewhere in the body, and remember, with thanks to Dr. Osgood, the possible existence of the bursa he describes, we may reserve excision of the inflamed area for extremely chronic and refractory cases in the same way as with cases of prepatellar bursitis which resisted treatment by other means.

In golf the pronator radii teres muscle comes into action to a degree not commonly realized, particularly in mashie and niblick shots out of bad ground, in the performance of which obviously forcible pronation causes the club to bite into the ground. I have never seen strain of this muscle of any great severity, but I can well imagine it occurring in a not over-muscular player.

In the treatment of cases which have had no early treatment or are refractory, but in which for the time at least there is no question of any operative measures, all septic foci must first be sought for and adequately treated until the toxic output has entirely ceased. Secondly, complete rest to the part must be obtained. The guide to correct treatment lies in an accurate knowledge of the functions of the injured muscle; the limb must be fixed in a position which relaxes the injured muscle while allowing as full play as possible to the uninjured ones. This is not always easy, but it is unsound treatment to limit the function of a limb more than can be avoided, as the muscles will require re-education and strengthening later. There is no method so good as a carefully applied plaster case or a plaster splint, which has the advantage that it is removable and therefore permits of massage. Where massage is unobtainable, or there is doubt that the patient will continue to wear the splint when not under the eye of the medical man, it is better to apply a plaster case for about six weeks, and rely on functional activity of the arm to restore use and power after its removal. By massage we seek to remove the effete products of inflammation and to loosen the limiting fibrous tissue that has formed. The affected area is moderately tender, though not as tender as it was when first injured. Massage to the required spot should be deep and vibratory and performed with the hand and not with a mechanical vibrator with an insensitive surface and of a force difficult to control. The pain produced should be little or absent, and the force of the pressure and vibrations should increase *pari passu* with the relief of the patient and the diminished sensation of resistance to the fingers. At the same time conservative centripetal massage should be given to the other muscles in order to keep up their tone and circulation, and controlled exercises given to these other muscles in such a manner as not to strain the injured part. This principle of relaxation applies to nearly all the minor injuries of which I am speaking; the essential point is to know exactly what position produces relaxation. The rest is easy.

In strains of the origin of the flexor carpi ulnaris the ulnar nerve is often thickened and tender and displaced or displaceable forwards even to the front of the internal condyle. Associated with this may be definite symptoms of ulnar neuritis, pain and tingling in the little and ring fingers, and so forth. The degree of mobility of the ulnar nerve in this region varies considerably under normal conditions. I have not been able quite to make up my mind whether these are cases of injury to an abnormally mobile nerve or whether the nerve is actually loosened by the injury, for abnormally

mobile nerves do not give rise to any symptoms. I am inclined to think that the injury loosens the nerve and also causes a traumatic neuritis; the nerve passes under a fibrous arch from which a certain number of the fibres of the flexor carpi ulnaris actually arise, and which may well be broken, thus liberating the nerve. This is a most painful condition, however it arises; it is treated initially by placing a soft wool pad behind the condyle and strapping it in place. In old-standing cases I have no hesitation in operating. The nerve is cut down on behind the condyle and either transplanted definitely to the front of the condyle and sutured into a bed made for it in the flexor muscles, or fixed back into its normal position by a strip of periosteum turned down from the humerus. Either of these proceedings will cure the condition, as the neuritis rapidly subsides when the nerve is no longer subject to recurrent injury.

The ligaments round the elbow, with the exception of the orbicular ligament, are of comparatively slight importance, and the trouble here is rarely ligamentous in origin. Similar muscle strains to those mentioned above occur in the insertions of the biceps, brachialis anticus, and triceps, and can be easily diagnosed by the situation of the tenderness and the pain on movement; they are readily treated on the same lines by relaxation of the damaged muscle. It is rarely necessary to suture the ruptured tendon. Bursitis of the bursa around the insertion of the biceps also occurs, but is not deserving of any special mention.

Partial or complete rupture of a muscle belly, such as the biceps, should be treated by complete relaxation of the muscle, and two pads strapped in position so as to approximate the divided ends and limit effusion. Union is always by fibrous tissue, and some degree of permanent impairment of function must always be anticipated, the degree depending on the extent of the injury. While massage may be employed as soon as the initial inflammation passes off, no movement of the muscle should be allowed until repair is complete. Suture of a muscle belly is, in my opinion, useless, as, the union being by fibrous tissue only, the muscle degenerates, and either a fresh rupture occurs or the fibrous tissue stretches when any great strain is put upon it. Where rupture has taken place, either through tendon or, more commonly, at the junction of tendon and muscle belly, open operation for repair by suture and careful after-treatment hold out good prospects of cure and should always be attempted.

In the neighbourhood of the wrist, where there are many tendons lubricated by a complicated system of tendon sheaths, teno-synovitis is naturally common. Perhaps the commonest site is along the tendons of the extensor communis digitorum. Simple teno-synovitis is caused by strain or excessive use of a tendon; the sheaths and parts around become inflamed and the lubrication defective. To treat such a condition by counter-irritation with iodine while permitting the full use of the tendons is like pouring water over an overheated car engine while allowing it to continue running with insufficient oil. This much used simple remedy will only cure the slightest cases, and is not really economical in time. If teno-synovitis of the extensor tendons be treated for a few days by complete rest of the fingers on a long cock-up splint and either counter-irritation or cooling lotions be applied, cure will really be more rapid; if the finger extensors alone are affected, it is not necessary to include the thumb, and thus the hand is not entirely disabled during treatment. Teno-synovitis thus treated will soon subside, but there is a special form which is particularly obstinate. It occurs in people—mainly women—who either play the piano very frequently or who have frequent need in their occupation to span the hand widely, as in the movement of playing an octave or grasping a large object in one hand. The symptoms are absolutely characteristic. There is a general sensation of weakness in the hand and pain and tenderness on pressure over the deep groove on the back of the radius, in which the tendon of the extensor longus pollicis runs, and along the tendons of the flexor and extensor carpi ulnaris. As may be readily noted on one's own hand, these two latter are synergic muscles in abduction of the thumb, preventing the abduction of the whole hand at the same time as the thumb. It may be worth mentioning that, as I wrote in the BRITISH MEDICAL JOURNAL[3] some years ago, in such patients as these the deep groove of the extensor longus pollicis may be converted into a narrow canal by overgrowth of bone and thick fibrous tissue. To such an extent may this occur that I have twice been compelled to operate to free the tendon and flatten out the groove by chiselling away bone. The results of operation were absolutely successful, and it can quite easily be done under a local anaesthetic. In the milder form of this condition, rest from piano playing and the avoidance of all actions which necessitate a wide grasp, such as holding a large vase, supplemented perhaps by wearing a wrist strap for a time, may suffice to cure, but I have found it necessary on some occasions to fix the wrist and hand in plaster with thumb abducted and hand deflected to the ulnar side for six weeks. This, being a much more drastic performance, has, in addition, a curative effect upon the functional element which is usually present in these cases, leading the patient to complain greatly of what cannot be a very severe pain.

To the prevalent custom of wearing a wrist-strap more or less permanently after a strain in the region of the wrist I have no objection, provided the patient be encouraged to dispense with the strap as much and as soon as possible, or at least to wear it only when engaged in some laborious work or sport. The strap gives a comfortable feeling of support, supplements the annular ligaments, and at the same time limits and controls the movements of the tendons as they pass through them, thus making a useful transition stage between absolute fixation and free movement. An elastic knee-cap, on the other hand, has a permanently constricting effect on the underlying vasti muscles, on which a large part of the lateral stability of the knee depends, and produces wasting and weakness of them, owing to inhibition of their blood supply and limitation of their activity. It is quite otherwise with the wrist, for the simple reason that in the wrist, with the exception of the pronator quadratus which lies deeply and the lower part of the flexor carpi ulnaris, there is no acting muscle to constrict and only a collection of practically avascular tendons.

Another disability that I would mention is mallet-finger, about which a series of letters appeared recently in the BRITISH MEDICAL JOURNAL; it is due to a rupture, partial or complete, of the extensor tendon on the dorsum of the last inter-phalangeal joint. It arises from a blow on the end of the finger, as in an ineffectual attempt to catch a cricket ball, and is often neglected in the early stages. The finger should be kept straight for three weeks on a straight palmar metal gutter splint. At the end of this time, if the rupture has been incomplete, the patient will be able to extend the joint voluntarily. If not, the tendon must have been completely torn, and an open operation for suture of the tendon, followed by splinting, is the only method that will suffice. In old-standing cases the structures on the flexor aspect may be so contracted that the finger cannot be straightened, and the question of amputation of the distal phalanx will arise.

Disabilities of the hand I propose to treat in a somewhat general manner, with more reference to general principles than to detail, as it is obviously impossible to cover every possible lesion. If we leave out such developed functions as piano playing, the functions of the hand may well be described as only two, grasping objects and picking up objects, and it is these two functions which we must endeavour to restore after injury. Apart from gross destruction of the hand or nerve injuries, the actual division of tendons and the after-results of cellulitis claim our chief attention. Owing probably to the greater complexity of their tendon sheaths, repair after suture is much less satisfactory in flexor than in extensor tendons, and although suture of cut finger flexors should always be carefully performed, when both flexor tendons of a finger are divided, a most guarded prognosis should always be given as to the subsequent utility of the finger; in manual labourers the hand is often more useful without the damaged finger than handicapped by a useless digit that impedes the action of its fellows. I do not, however, wish to be unduly pessimistic, as it is often possible to obtain a good result by careful after-treatment. Suture of extensor tendons is always promising, and even when there has been such a loss of tendon length that end-to-end suture is impossible, grafts of fascia lata are usually successful. I will say nothing of the immediate treatment of septic hands and fingers, except that acute inflammation is an indication for rest, and that too early movement should be avoided, as recovery of function is not hastened, but hindered thereby.

In order to be able to grasp an object satisfactorily flexion of at least two fingers is necessary, the possession of a thumb advisable but not essential, and a wrist capable of dorsi-flexion essential if the grip is to be a strong one; for a good grip of a round object the preservation of the form and mobility of the transverse arches of the hand is of prime importance, and therefore the physiotherapy or, if necessary,

the operative interference with the metacarpal joints must not be neglected. The due mobility of these transverse arches is also of importance in picking up objects, as without it, although opposition of the thumb may be free and unimpaired, the thumb cannot reach farther than the middle finger, and the fourth and fifth fingers cannot be used in conjunction with it. Abduction and opposition of the thumb are easily lost after septic wounds of the palm. If opposition is defective a band of adhesive strapping round the hand, keeping the thumb in opposition and preserving the palmar arches, reapplied as progress is made and the band loosens, is quite effective. For deficiency in abduction a series of small plaster splints moulded to the first interdigital space will gradually restore function.

Fingers may become stiff from a variety of causes, but assuming them to be potentially mobile and useful—that is to say, that all the structures essential to their mobility are present—their restoration to function is a purely mechanical problem. In dealing with the problem elsewhere[4] I described certain methods of treatment by metal splints and plaster that I had devised. I still use these methods and find them effective, but others have published other devices equally good, and the principles involved are in the main identical. If a masseuse move a stiff finger to and fro repeatedly, resistance is induced, often unnecessary pain, and a certain amount of reactionary inflammation. Should massage alone without mechanical aid be employed, the hand should have a preliminary bath treatment, preferably paraffin, and the massage immediately after should be confined to a single movement of the affected joint in each direction to the full extent possible without pain; the patient should then be encouraged and re-educated in active movements. I strongly disapprove of forcible mobilization of stiff fingers under an anaesthetic; though applicable to other joints, this method is not satisfactory for the fingers, and more gradual methods are indicated. The classification and the principles of treatment I advocate are as follows:

A. Fingers flexed when wrist is dorsiflexed, extension possible with wrist flexed. This, the type of ischaemic contraction due to shortening of flexor tendons, is best treated by Sir Robert Jones's method, the joints being straightened seriatim, beginning distally, leaving each joint in the deformed position until all the joints distal to it have been corrected, and retaining that correction by continued splinting, ending up with dorsiflexion of the wrist.

B. Wrist movement free, one or more fingers flexed at all three joints, contraction unaffected by position of wrist. One must aim at obtaining extension without losing flexion. I employ a metal splint extending beyond the fingers and terminating in a bar, fixed to the hand by plaster. To the affected fingers loops of adhesive plaster are fixed and tapes are tied between these and the bar. By gradual tightening of these tapes extension is obtained, but every day the tapes are released and the finger is brought back to its original flexed position and the tape then retied. There is then no loss of flexion; should this be noticed, extension is being carried out too rapidly and one must call a halt.

C. Free movement at the metacarpo-phalangeal joint, distal joints flexed. Gradual straightening on metal palmar gutter splints will suffice, flexion being preserved by daily movements, as before.

D. Metacarpo-phalangeal joints stiff in hyperextension, distal joints straight or slightly flexed. The important principle in treatment consists in getting the metacarpo-phalangeal joints to pass the dead point or straight line position. For this condition I use an ordinary short cock-up splint (which keeps the wrist dorsiflexed) with attached to it a quadrilateral wire loop springing from its palmar surface at the wrist and extending to the level of the metacarpal extremities. To this the fingers are flexed by tapes; daily movement as before.

These methods exert very great force, but can be graduated to a nicety; correction is gradual and gives no pain, and the range of movement is never lost. Tape traction is better than elastic, as there is no tendency on the part of the patient to resist it. Finally, employment of the hand, at first in gymnastic exercises and later in actual work, will put the finishing touches on the treatment.

REFERENCES.

[1] Sir Robert Jones: *Injuries to Joints*. Oxford War Primers. [2] Robert B. Osgood: *Radio-humeral Bursitis, Epicondylitis, Epicondylalgia (Tennis Elbow)*. [3] An Abnormality of the Tendon Grooves of the Radius, BRITISH MEDICAL JOURNAL, May 10th, 1919. [4] Stiff Fingers, with Special Reference to Methods of Treatment by Metal and Plaster Splints, *Journ. of Orthop. Surgery*, June, 1919.

THE DOSAGE OF RADIUM.

BY

DAWSON TURNER, M.D.EDIN.,

IN CHARGE OF THE RADIUM TREATMENT AT EDINBURGH ROYAL INFIRMARY.

THE duration of the application is a most important element in radium treatment, and it is one which there may be a tendency to overlook in institutions where large quantities of radium are available. Consider, for an example, a dose of 500 mg. hours, which would be a fair dose to administer to a small rodent ulcer. This dose might be given by 10 mg. of radium for fifty hours, or by 50 mg. for ten hours, or by 500 mg. for one hour. Does anyone contend that similar effects would be produced in each case? I have no hesitation in making the affirmation, based upon an experience of twenty years, that for each case there is a certain optimum combination of milligrams and of hours, and that this question is one for the radium expert to decide. Levin and Joseph,[1] from an experimental study of the influence of radiations on the development and growth of the crown gall on plants, have shown that the primary effect of radium or *x*-ray radiations consists in the inhibition of the proliferating power of the cancer cells and not in their direct destruction. The crown gall, tumour-like formation on plants is so called because the growth frequently appears where stem and root join (called the crown). It is due to a parasite and can be induced artificially by inoculating a plant with an agar culture of the micro-organism. Plants were inoculated by these observers and some were submitted to radiation and some kept as controls; the control plants developed large crown galls, the others none or stunted growths containing true tumour cells. Cancer cells go through a cycle of (1) youth, (2) maturity, (3) old age. At one time they are actively dividing and at another they are not, and it has been shown that they are more susceptible to radiations when their nuclei are dividing than when they are in any other stage. In certain stages they may be as immune as normal tissues.

The lesson to be learned from a consideration of these facts is that in order that the dose of radium may be effectual it must be applied for a certain time, for it is only by a prolonged application that we can make fairly sure of catching all the cancer cells in their susceptible stage. We may therefore conclude that small amounts of radium for prolonged periods are more likely to prove beneficial than large amounts for short periods. The oven may be too hot and the bread will be burned on the outside instead of being baked throughout.

To take another point: suppose one possesses 100 mg. of radium, in what quantities is it best to put it up into tubes? The answer depends mainly upon the nature of the diseased condition to be attacked, upon its situation, its area, its volume, and upon whether the radium is to be applied externally or buried in the growth. Take the case of a lymphosarcoma—perhaps the most susceptible of all growths to radium—of the size of a large orange; in this case it would be best to have the radium put up in 5 or 10 mg. portions in separate tubes, so that they could be distributed throughout the mass, and particularly arranged like sentinels around the borders of the growth, for in this way the central parts will be receiving cross-fire radiation from all the tubes, but the peripheral parts will only get efficient radiation from the peripherally placed tube which happens to be nearest. In order that the whole of a growth may be efficiently and uniformly radiated the radium should theoretically be uniformly distributed throughout it—in fact, the desideratum would be to scatter radium like pepper from a pepper pot throughout the mass. Though this is for several reasons impracticable yet the more nearly we can approach to it the better. Dr. Stevenson's needles are a means to this end. Small tubes are filled with the radium emanation and are enclosed in hypodermic needles for embedding in the neoplasm. There is a disadvantage which applies to all cases in which the emanation is used, owing to its steady loss of strength—namely, that the dosage is not known unless the tubes have been tested for their emanation strength before being employed and unless a table of their rate of decay be consulted. As the time element in radium treatment, as I have endeavoured to show, is important, emanation tubes have the disadvantage that they would have to be replaced from time to time by freshly charged ones. Where the application is external this would be easily done, but in

the case of a tumour, in which the radium is embedded, it would mean a minor surgical operation each time the emanation tubes were changed.

Another point of importance is to give the whole maximum dose at first, and not to break it up into smaller ones which are repeated. The latter course may in certain cases turn out a fatal error, and this chiefly because the malignant cells, which were stunned but not killed by the first application, will, when they recover, tend to breed cells which are more immune to radiation, until, the same process continuing after several exposures, only those cells will survive which are refractory to the rays. There is a tendency by natural selection to breed cells which are immune, and further exposures will now only do harm. The knock-out blow should be given by a sufficiently long exposure to a sufficient amount of radium while the cancer cells are not suspecting an attack; they must be taken by surprise, so that they will be unable to organize a resistance and be incapable of putting up a serious defence.

Were more attention paid to these points there would, I venture to think, be fewer failures following radium treatment.

REFERENCE.
[1] *Annals of Surgery*, vol. 67, p. 442.

THE FUNCTION OF THE ADRENAL GLANDS AND ITS RELATION TO CONCENTRATION OF HYDROGEN IONS.*

BY

ROBERT McCARRISON, M.D., F.R.C.P.,

LIEUTENANT-COLONEL, INDIAN MEDICAL SERVICE; IN CHARGE OF THE DEFICIENCY DISEASES INQUIRY, INDIAN RESEARCH FUND ASSOCIATION

(From the Pasteur Institute of Southern India, Coonoor.)

THE object of this research was to inquire further into the causation of the adrenal hypertrophy occurring in inanition and in avitaminosis.[1] This hypertrophy is accompanied by an increased epinephrin content of the glands,[1] and is due, in the avitaminosis of birds, to the absence of vitamins A and B from the food. It is associated also, as shown by Cramer,[2] with an almost complete disappearance of lipoids from the adrenal cortex. The enlargement rapidly reverts to a more normal state when the missing vitamins are supplied. The question as to why hypertrophy of the adrenal glands should occur under conditions that give rise to greater or lesser degrees of atrophy of all other organs (the pituitary body in males excepted)[1] is of fundamental importance both in relation to the disorders of nutrition in which it is found and to the function of the adrenal bodies themselves. The facts suggest some purpose underlying their enlargement; some purpose, also, in their increased content of epinephrin. It was thought that it might be related to the increased concentration of hydrogen ions that occurs in avitaminosis. Recently Kato,[3] Takahira,[4] and others have drawn attention to the increased hydrogen ion concentration of nerves, spinal cord, heart, and blood vessels in polyneuritis avium. I have confirmed this observation in so far as it relates to the heart, and found also an increase of P_H concentration in pectoral muscle. In a few cases of polyneuritis columbarum accompanied with effusion into the pericardial sac or with oedema of the tissues, the dropsical fluid has been well on the acid side of neutrality—pericardial effusion, for example, having a P_H of approximately 6.5.

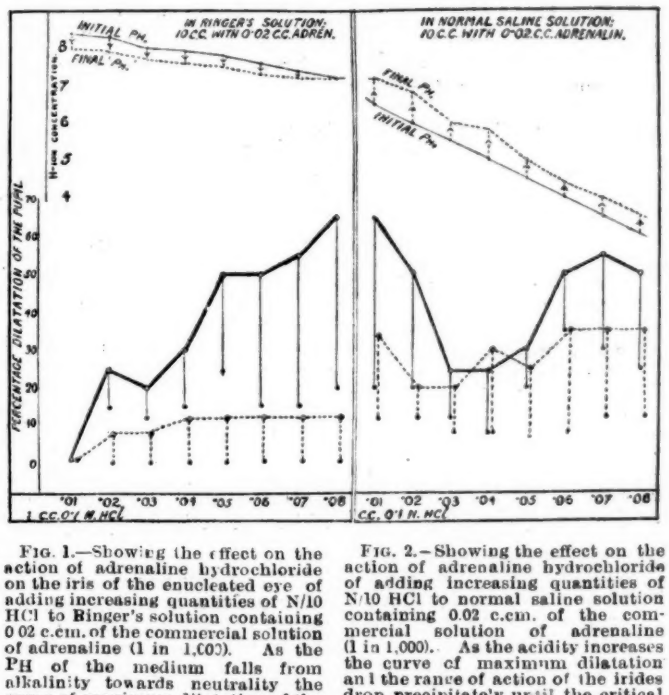

IN RINGER'S SOLUTION: 10 C.C. WITH 0·02 C.C. ADREN.
INITIAL PH.
FINAL PH.
IN NORMAL SALINE SOLUTION: 10 C.C. WITH 0·02 C.C. ADRENALIN.
FINAL PH.
INITIAL PH.
H-ION CONCENTRATION
PERCENTAGE DILATATION OF THE PUPIL
1 CC. 0·1 N. HCL
CC. 0·1 N. HCL

FIG. 1.—Showing the effect on the action of adrenaline hydrochloride on the iris of the enucleated eye of adding increasing quantities of N/10 HCl to Ringer's solution containing 0·02 c.cm. of the commercial solution of adrenaline (1 in 1,000). As the P_H of the medium falls from alkalinity towards neutrality the curve of maximum dilatation of the pupils (shown as a thick black line) gradually heightens, and the range of action of the irides increases (shown as vertical continued lines falling from the points of maximum dilatation to points of maximum contraction). The curve of maximum dilatation and the ranges of action of the irides of control eyes subjected to the influence of the same dose of adrenaline, but without the addition of increasing amounts of N/10 HCl, are shown in dotted lines. The approximate initial and final P_H in the tubes to which HCl was added are shown at the top of the figure. Initial P_H of control tubes was approximately 8. It will be noted that under the influence of the metabolic activities of the eye the P_H falls towards neutrality during the course of the experiment (thirty minutes).

FIG. 2.—Showing the effect on the action of adrenaline hydrochloride of adding increasing quantities of N/10 HCl to normal saline solution containing 0.02 c.cm. of the commercial solution of adrenaline (1 in 1,000). As the acidity increases the curve of maximum dilatation and the range of action of the irides drop precipitately until the critical point of acidity is reached at 0.03 c.cm. N/10 HCl. The lesser degrees of acidity (0.01 and 0.02 N/10 HCl) enhance the action of adrenaline on the pupil of the enucleated eye; greater degrees (0.03 to 0.5 N/10 HCl) inhibit its action; greater degrees still enhance it again, while the irides tend to be fixed in the position of mydriasis. The gulf of inhibition is wider in normal saline than in serum (compare Fig. 3). Approximate initial and final P_H in acid tubes are shown at the top of the figure; initial P_H of control tubes was approximately 7. It will be noted that under the influence of the metabolic activity of the eyes the P_H in the acid tubes rises towards neutrality. Experimental eyes, uninterrupted lines; controls, without acid, dotted lines. Duration of observation, thirty minutes.

Experiments were accordingly undertaken to ascertain the effect of changes in concentration of hydrogen ions on the action of commercial adrenaline hydrochloride and of the active principle of the adrenal medulla—epinephrin—in various media.

Enucleated eyes of the toad (*Bufo melanostictus*) were employed for the purpose; in all 1,300 were used. Each test on one eye was controlled by the other eye of the same animal. It has been stated that while adrenaline causes mydriasis of the enucleated frog's eye, it does not do so in the enucleated toad's eye. So far as *Bufo melanostictus* is concerned this is not the case. It has long been known that, by its action in stimulating the dilator mechanism of the iris, adrenaline causes mydriasis; but, so far as I can find, no reference is made in the literature to its further and, as I believe, more important action of sensitizing the enucleated eye in such a way that the iris responds more readily to the normal stimulus of light through its maximum range of action. This sensitivity of the toad's iris to the stimulus of light, when under the influence of adrenaline hydrochloride or of epinephrin, was utilized as a means of determining the effect upon the action of these substances of changes in concentration of hydrogen ions in various media. P_H indicator tablets ("A. and H.") were used throughout; the P_H values are therefore approximate.

The observations made in the course of the inquiry are enumerated below; the reader is referred to the full paper for details regarding them.

1. There is in the eye of *Bufo melanostictus* a peripheral mechanism which can act independently of the nerve centres. It is responsive to the stimulus of light within a limited range—25 per cent. dilatation in the dark to slit-like contraction on exposure to light—provided the eye be preserved in media of suitable composition and suitable P_H concentration. In such it retains a gradually waning sensitivity for a comparatively short period—approximately two hours.

2. This mechanism can be so sensitized by adrenaline hydrochloride or by epinephrin that, under appropriate conditions, the iris will respond with enhanced sensitiveness to the stimulus of light through its maximum range of action. It retains its enhanced sensitivity for prolonged periods—three to eight hours—and in exceptional cases for even longer periods. This effect of adrenaline and of epinephrin is spoken of as "the adrenaline-iris-light-sensitivity reaction."

* Abstract of Twelfth Report to the Indian Research Fund Association on the Pathogenesis of Deficiency Disease. The full paper will appear in an early number of the *Indian Journal of Medical Research*.

It is markedly influenced by temperature conditions—heat inhibiting it, cold enhancing it.

3. The action of adrenaline hydrochloride and of epinephrin is dependent in some measure on the composition of the media in which the eye is contained: it is greatest in fresh serum and normal saline solution, least in Ringer's solution. Compare "controls" in Figs. 1, 2, 3, 5, and 6.

4. The action of adrenaline hydrochloride and of epinephrin is intimately correlated with the concentration of hydrogen ions in the medium containing the eye:

(*a*) Slight increases in acidity enhance the action of small doses of adrenaline hydrochloride or of epinephrin; greater increases of acidity retard it; greater increases still tend to fix the pupil in the mydriatic position. (Figs. 2 and 3.)

(*b*) As the medium approaches neutrality from alkalinity the range of action of the irides, under the influence of adrenaline hydrochloride or of epinephrin, *increases* until at the neutral point they respond to the stimulus of light through a wide range of action. (Fig. 1.)

FIG. 3.

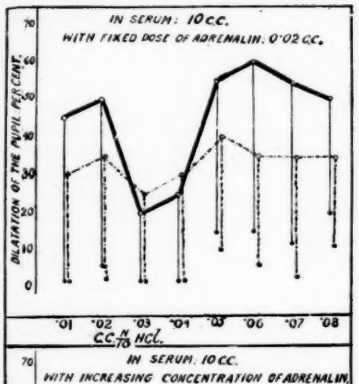


FIG. 4.

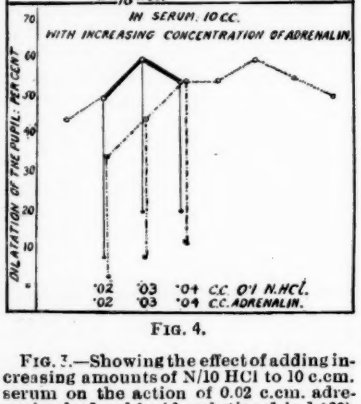


FIG. 3.—Showing the effect of adding increasing amounts of N/10 HCl to 10 c.cm. serum on the action of 0.02 c.cm. adrenaline hydrochloride solution (1 in 1,000). The lesser increases of acidity enhance its action, greater increases of acidity retard it; greater increases still again enhance its action. The critical point of acidity is seen at 0.03 to 0.04 c.cm N/10 HCl, where the gulf in the curve of maximum dilatation is situated. Experimental eyes, uninterrupted lines; controls, without acid, dotted lines. Duration of observation, thirty minutes.

FIG. 4.—Showing how the gulf of inhibition can be bridged by increasing the concentration of adrenaline in proportion to the increase in acidity of the medium. The "bridge" is shown as a dark line in the course of the dotted curve of dilatation taken from Fig. 3. Experimental eyes, uninterrupted lines; controls, without acid, dotted lines. Duration of observation, thirty minutes.

(*c*) As the medium departs from neutrality towards acidity the range of action of the irides, under the influence of adrenaline hydrochloride or of epinephrin, *diminishes* until a point is reached — "the critical point of acidity" — at which their action is completely inhibited. (Figs. 2, 3, and 5.)

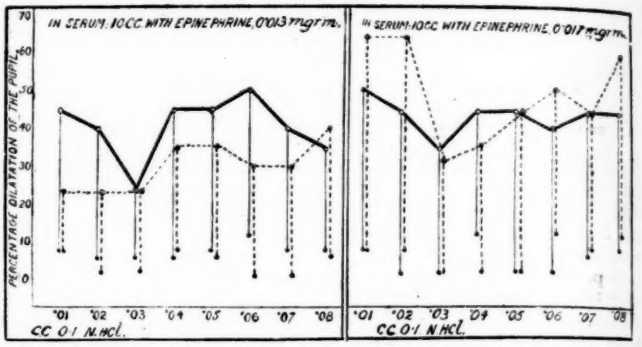
(*d*) This point is attained when 0.03 to 0.04 c.cm. N/10 HCl is added to 10 c.cm. of serum containing 0.02 c.cm. commercial adrenaline solution (1 in 1,000)* or 25 mg. of emulsion of guinea-pig's adrenals (equivalent to approximately 0.013 mg. of epinephrin). (Figs. 3 and 5.)

(*e*) Epinephrin, in appropriate dosage in normal saline and Ringer's solution, exerts its optimum effect within a range of P_H of approximately 7.4 to 6.8; above or below these limits its action is inhibited.

5. By increasing the concentration of adrenaline hydrochloride or of epinephrin in proportion to the increase in acidity the gulf of inhibition can be bridged. (Figs. 3 and 4.) In order, for example, that the same effect may be produced by adrenaline hydrochloride in 10 c.cm. of sheep's serum, containing 0.04 c.cm. N/10 HCl, as is produced in 10 c.cm. neutral serum three times the amount of adrenaline is required. (Fig. 4.)

6. The influence exerted on the action of epinephrin and of adrenaline by increased concentration of hydrogen ions is dependent on the quantity of epinephrin or of adrenaline hydrochloride present in the medium; while lesser degrees of acidity enhance the effect of the smallest dose of these substances that exerts any action whatever upon the eye, the effect of larger doses may be retarded by the same degrees of acidity. (Figs. 5 and 6.) The maintenance of maximal functional activity by the iris of the enucleated toad's eye demands accurate adjustment between the quantity of epinephrin and the concentration of hydrogen ions.

7. The cortex of the adrenal glands, when associated in its action with adrenaline hydrochloride or with epinephrin, possesses the property of aiding the eye to bring the medium in which it is contained towards neutrality. This property may be lost by, or be greatly reduced in, the adrenal glands of birds suffering from polyneuritis columbarum. Its loss may possibly be correlated with the loss of cortical lipoids in this condition, and with the loss of lipoids from the blood in human beri-beri. Not only, therefore, is the adrenal medulla intimately related in its function to the concentration of hydrogen ions in the medium through which it acts, but the adrenal gland as a whole contributes its share to the regulation of the neutrality of the medium.


IN SERUM: 10 C.C. WITH EPINEPHRINE, 0·013 mgr. m.
IN SERUM: 10 C.C. WITH EPINEPHRINE, 0·017 mgr. m.
PERCENTAGE DILATATION OF THE PUPIL
CC 0·1 N.HCl.
CC 0·1 N.HCl.

FIGS. 5 and 6.—Showing (*a*) The effect of the lesser degrees of acidity—0.01 and 0.02 N/10 HCl in 10 c.cm. sheep's serum—in enhancing the action of approximately 0.013 mg. of epinephrin (from guinea-pig) on the irides of enucleated toad's eyes (Fig. 5). Effects on experimental eyes shown in uninterrupted lines; on control eyes, without acid, in dotted lines. (*b*) The effect of the same degrees of acidity in retarding the action of a larger dose of epinephrin—approximately 0.017 mg. (Fig. 6). In Fig. 5 the critical point of acidity is shown at 0.03 c.cm. N/10 HCl. Duration of observation, thirty minutes.

8. The serum of birds suffering from polyneuritis columbarum enhances the action on the enucleated toad's eye of minute doses of adrenaline hydrochloride; this action, interpreted in the light of the above results, indicates increased acidity of their serums.

9. The pericardial effusion from birds suffering from polyneuritis columbarum (P_H approximately 6.5) retards the action on the enucleated toad's eye of minute doses of epinephrin (healthy pigeon's adrenal emulsion); this action, interpreted in the light of the above results, indicates that such effusions have reached "the critical point of acidity" at which the action of epinephrin is inhibited.

Conclusions.

1. The active principle of the adrenal medulla maintains and enhances the sensitivity of, rather than stimulates, the myoneural junctions of the true sympathetic terminals of the enucleated toad's eye, so that their response to the stimulus of light is more sensitive and their sensitivity is longer retained.

2. If this sensitivity is to be sustained and optimum function of the iris is to be maintained in media on the acid side of neutrality, the concentration of epinephrin must be proportionate to the concentration of hydrogen ions in the medium.

3. The observations recorded in this paper provide evidence that: (*a*) The enlargement—with increased epinephrin content—of the adrenal glands in inanition and in avitaminosis may be correlated with the condition of acidosis associated with these states. Its occurrence, for the most part, during the terminal phases of avitaminosis, its association with marked respiratory disturbances,[1] with oxygen-want,[1] with falling body temperature,[1] and with interference with oxygenation, and its rapid disappearance on the provision of the missing vitamins, suggest that it is an emergency effort on the part of the adrenal glands. (*b*) The attempted exercise of an emergency function by the adrenal glands may be expected to occur in all conditions of alkalosis or of acidosis.

* As adrenaline hydrochloride rapidly deteriorates in India on exposure to air this concentration of adrenaline will probably be found too high where fresher stocks of the drug are available. All my observations were made with stocks that had been in India for several years. It is to be emphasized that the effects of hydrogen ion concentration on the action of adrenaline or of epinephrin are demonstrable with such minimal amounts of these substances as exert any action whatever upon the enucleated eye.—R. McC.

REFERENCES.

[1] BRITISH MEDICAL JOURNAL, February 15th, 1919. *Studies in Deficiency Disease*, London, 1921.

[2] *Proc. Phys. Soc.*, 1920 (May 15th). *Journ. Phys.*, liv. *Brit. Journ. Exper. Path.*, 1920 (August).

[3] Kitasato: *Arch. Exper. Med.*, 1921, iv, No. 3, pp. 207-216.

[4] *Keio Igaku* (*Keio Med. Journ.*), 1921, Octo. I, No. 10.

EMBOLISM OF THE RIGHT BRACHIAL ARTERY AS A COMPLICATION OF LOBAR PNEUMONIA.

BY

A. H. D. SMITH, M.C., M.B., CH.B.,

LLANELLY.

THE rarity of embolism of a main arterial trunk as a complication of lobar pneumonia, and the unusual bacteriological findings on examination of the blood, prompt me to make a record of this case.

W. J., aged 39, an insured person who worked as a labourer in a tinplate works, on October 16th, 1922, felt chilly and had a rigor after having been exposed to cold and getting wet through during a drinking bout. On October 17th I found him complaining of pain in the right side of the chest. The temperature was 104°, pulse 110, and the sputum was rusty. The right upper lobe was found to be the site of lobar pneumonia. All over the rest of the chest were signs of chronic bronchitis. Crisis occurred on the ninth day; at no time was there any real cause for anxiety, and apart from a soft systolic bruit at the apex there were no physical signs or symptoms of any cardiac affection. After the crisis convalescence was uneventful until the fourth day, when he began coughing badly, expectoration was profuse, the temperature was elevated, and sweating was marked. There were signs of bronchitis over both lungs; over the pneumonic area in the right lung the breath sounds were cavernous, and there were abundant crepitations. Night sweating was profuse and occasionally delirium was marked. Tubercle bacilli were not found in the sputum, but the clinical picture and the facts which came to light in the family and personal history strongly supported the view that the patient was now suffering from an acute tuberculous infection of the right lung. I was informed that the patient had, after his discharge from the army, been under treatment at a military hospital for tuberculous disease of the spine. His only brother had died recently of tuberculous infection of the lungs. Examination of the heart during this period showed no abnormality save for the soft systolic bruit at the apex previously noticed.

This was the clinical picture up to November 9th. On November 10th, during my visit in the morning, the patient told me that during the night he had been seized with very acute pain in the right arm; examination of that arm, conducted with difficulty owing to the great pain caused by the slightest movement, showed no apparent difference from the other; the heat in both was equal; there was no swelling in the right arm and no difference in colour between it and the sound arm. There was, however, exquisite pain in the affected arm and paresis of the muscles. The hyperaesthesia was confined to the area from the wrist to the shoulder. There was almost complete anaesthesia in the tips of the thumb and fingers. The right radial pulse was absent both to the finger and to the stethoscope. Following the course of the radial upward no pulsation could be felt in the ante-cubital fossa. At the level of the posterior wall of the axilla, in the line of the vessel, a very tender lump about the size of a small hazel nut could be felt. The surrounding structures appeared normal. Above this level the vessel could be felt pulsating strongly. The radial pulse in the left side was present and bounding in type. An examination of the heart revealed nothing further than the soft systolic bruit already noted. I felt I was dealing with an embolism of the right brachial artery, and thought that the probable source was an infective endocarditis. The cardiac physical signs at this stage were, however, not in any way pronounced.

The right arm was wrapped in cotton-wool and immobilized. For the next three days treatment was expectant, and a careful examination of the arm and heart was made daily. The appearance of the arm never changed. Compared with the sound arm there was no difference in size, heat, or colour. The hyperaesthesia, however, remained marked, as did the anaesthesia of the tips of the thumb and fingers. The patient was profoundly intoxicated, delirium became marked, and night sweats became very heavy. The cough was less, but the physical signs in the lung were still those of acute phthisis. On November 11th and 12th there was no alteration in the physical signs in the heart. On the latter day he was seen with me by Dr. Samuel Williams, who agreed that the diagnosis was probably septic endocarditis following lobar pneumonia, and that the embolus was a result of the endocarditis. On that day definite signs of endocarditis were present in the shape of marked systolic and presystolic bruits at the apex. The murmurs were harsh and ran into each other. At the base of the heart a soft high-pitched systolic bruit could be heard distinct in pitch from the murmur present at the apex.

On November 13th a blood culture was made and sent by hand to Dr. Sladden, pathologist, Beck Laboratory, Swansea General Hospital. At this time the physical signs were as on the previous day. The general condition of the patient was very poor indeed, and he might be described as being in a typhoid state with the low type of delirium. I was called hurriedly to see him about 10.30 that night. On my arrival a few minutes later I found he was dead. A few minutes prior to my arrival he had been talking quite sensibly to his friends. They said he seemed to fall off to sleep and then they found he was dead. I was unfortunately unable to get permission to perform a *post-mortem* examination.

I have recorded the case because embolism of a main arterial trunk as a post-pneumonic complication is unusual. Osler[1] records a case of embolism of the femoral artery as a pneumonic complication and states that it is very rare. In his case the complication occurred during the height of the fever, and the limb had to be amputated. The patient recovered.

In the case here recorded the obstruction was evidently complete and sudden. At no time was there any sign of interference with the circulation such as might necessitate surgical interference. Apart from the paresis and the nerve symptoms the limb was apparently normal. The obstruction must have been below the circumflex artery, and the condition of the arm again demonstrates the wonderful collateral circulation which exists in the upper limb. Complete obstruction of a main trunk with so little interference must, I think, be a very rare condition. Other points of interest in the case are:

1. The absence of definite signs of endocarditis in the early stage of the embolus.
2. The difficulties of diagnosis owing to the clinical picture in the lungs, so suggestive of acute phthisis.
3. The result of the bacteriological findings of the blood. Dr. Sladden's report was as follows:

"A plentiful growth of streptococcal chains occurred. Fuller tests showed this to be a non-haemolytic strain with the sugar reactions of *Streptococcus salivarius*. It was not bile-soluble, and grew readily on ordinary broth medium. It was therefore not in any way related to pneumococcus as usually identified."

I had expected the blood culture to reveal the presence of pneumococcus. Were the endocarditis and embolus the result of pneumonia or were they independent of the primary condition? Unfortunately the sputum was not examined for the streptococcus which was found in the blood.

REFERENCE.

[1] Osler: *Principles and Practice of Medicine*, p. 90.

THE BLOOD AS GUIDE TO EARLY DIAGNOSIS IN LEAD POISONING.

BY

ROBERT CRAIK, M.D.GLASG.,

EALING.

LEAD poisoning is commoner than is generally supposed, and it is useful for practical purposes to recognize four classes of cases. The industrial includes workers engaged in smelting or making white lead, etc. This class is invariably detected by experienced medical men at the works. In general practice cases are mainly occupational—painter, plumber, etc. Recently there have been more cases than usual in painters. The practice of moistening the sandpaper with oil is practically unknown in London, and it is fine dust arising from dry sandpapering indoors which does the damage. I have known a healthy man to contract acute plumbism in this way in three weeks. Painters often drink much beer, and in such case constipation is not to be expected with the colic.

Criminal cases used to be frequent in the Midlands, but I have seen only one in London. Diachylon is taken to produce abortion early in pregnancy by women—generally married women. Symptoms are often vague or misleading: constipation, vomiting, even albuminuria and headache, may be attributed to the condition, and abdominal pain that would otherwise secure attention is minimized by the woman as she hopes it is the prelude to miscarriage. The gums may give no help as the patient may have artificial teeth. Further, slight pyrexia is not unusual and agonizing colic may be attended with urgent vomiting—not unlike that due to an acute abdominal lesion. Only early diagnosis can save these women from serious illness, and in no class is blood examination so helpful.

All other cases may be lumped together as domestic and arising from food, drink, etc. Recently there has been an outbreak in this district due to accidental contamination of beer. But of 9 cases seen since midsummer only 3 were due to beer alone, though in 3 others it was probably an important factor. In the remaining 3 beer could be excluded—in one the source remains unknown, but in two painters it was occupational. These two were severe and conspicuous examples of acute lead colic.

In 30 cases of all kinds I have seen wrist-drop only once, and the patient (potman) developed encephalopathy about a year later and died. Another case (criminal) developed the encephalopathic type, but recovered after a long illness. In 28 there was practically no obvious symptom after a

fortnight's treatment. The longer diagnosis is deferred the greater are the variety and the duration of the symptoms. To hesitate in the absence of wrist-drop is like waiting for locomotor ataxia before diagnosing syphilis. In 19 out of 20 cases the patient first seeks advice for abdominal pain, which may be severe colic or only vague discomfort, and it is only in occupational cases that lead is likely to be suspected. In the latter a blue line is seldom absent, but this is not conclusive evidence.

1. *Blue Line.*—In industrial cases this is practically always present, but it may also be found in healthy workers. It means deposit of lead on the gums and is acquired from dust. In occupational cases the line is of more importance and means faulty habits, which are sure to end in plumbism if they have not already done so. In domestic cases where lead has been ingested in minute quantities in beverages, even when symptoms of poisoning are present, this sign may be absent. It is generally rather faint, and I have known such a case still undetected a fortnight after admission as alcoholic neuritis to the ward of a teaching hospital. Blue line demands careful examination of the patient or worker, but diagnosis must always be independent of blue line, which remains only valuable presumptive evidence. All are agreed as to the importance of early diagnosis in syphilis, and this is not less essential in plumbism. In order to effect this, diagnosis must depend mainly on a clear conception of the importance of two factors—lead in the urine and punctate basophilia in the blood film.

2. *Lead in the Urine.*—We are assured that lead may be found in the urine of healthy industrials. In them minute quantities are always present in the system, but satisfactory elimination by kidneys and bowel is said to prevent accumulation and poisoning. This can hardly be regarded as satisfactory, and in my opinion such cases require further investigation. In lead poisoning the metal is always present in the urine and remains for weeks or months after treatment is undertaken. In the case of suspicious symptoms examination of the urine affords valuable diagnostic evidence, or, alternatively, altogether excludes lead. It should be oftener employed.

3. *Punctate Basophilia.*—This sign is neglected because its significance is misunderstood. It is necessary to recall a few facts of haematology. Polychromasia is a sign of unusually active erythrogenesis, and is conspicuous in the blood of the newborn babe, where it is associated with nucleated reds. In adults polychrome erythrocytes are still readily attracted into the blood stream, and appear in minor anaemias of convalescents and even after moderate haemorrhage, whereas erythroblasts only appear in more serious anaemias or after severe haemorrhage. In the so-called pernicious anaemias a toxin is also exciting the marrow to pathological regeneration. The first indication of this is the appearance of punctated erythrocytes, which later on are associated with megaloblasts, giving a blood picture of anisocytosis, polychromasia, and normoblasts (normal regeneration), combined with poikilocytosis, punctate basophilia, Cabot rings, and megaloblasts (pathological regeneration). All these may appear fairly early in mild lead intoxication, but for some weeks there is usually only anisocytosis, polychromasia, and punctate basophilia. Thus lead acts directly on the marrow in a similar way to the toxin in a pernicious anaemia. In malaria at every paroxysm the marrow is excited in the same way, but the reaction is transient. With these exceptions, pathological regeneration is seldom seen, and it is safe to say that, in the absence of serious anaemia, punctate basophilia is more likely to be caused by lead than by anything else. Now, anaemia is never serious in the early weeks of lead poisoning. Basophilia is pathological, and demands investigation just as much as albuminuria or glycosuria. So long as it is present something is acting injuriously on the marrow, and if this is lead the urine will contain a trace of the metal even in the absence of corroborative symptoms.

As I have indicated, basophilia is only one in a series of biological reactions inevitably excited by small doses of lead. When diagnosis is early — whatever the treatment — the reaction usually disappears within three months, and it is interesting to watch the subsidence of the reaction in the blood film. Not much difference is seen for a month, but soon afterwards blasts disappear in mild cases and search for basophils becomes necessary, though these can usually be found for two months. With the help of the Clinical Research Association I have compared this with disappearance of lead from the urine. In a mild case due to beer basophilia was still seen fifty-two days after ingestion ceased, and half a pint of morning urine gave a trace of lead. In a more severe case of painters' colic erythroblasts were found thirty-nine days after leaving work, but a chance sample of eight ounces of urine gave no result. On the fiftieth day there were easily found anisocytosis, polychromasia, and punctate basophilia, and, after a search, Cabot rings and one punctated erythroblast. The whole twenty-four hours' urine was collected for the same day and gave a trace of lead. Apparently these two signs disappear about the same time.

I have already pointed out how basophilia may be used to exclude lead poisoning (BRITISH MEDICAL JOURNAL, 1917, ii, p. 650). It serves another purpose in enabling one to follow the progress of a case. On finding brisk pathological regeneration in a potman some months after leaving work with colic and limp hands, I convicted him of continued indulgence. He disappeared for some months, to return with double wrist-drop, albuminuria, and brisk pathological regeneration. His protestations suggested to me that possibly a second unknown source of poisoning existed, and I advised him to leave the district. This he hesitated to do, and a few weeks after was taken, comatose and convulsed, to Isleworth, where he soon died. In conclusion, I suggest that diagnosis should depend, not on gross signs, but on appreciation of suspicious symptoms and investigation of blood and urine. Whereas examination of the urine is a tedious process, the blood film is quick, easy, and almost as reliable. I can testify that early diagnosis will avert gross symptoms, so that in a month Government referees will reject cases still showing blue line on the gums, punctated erythroblasts in the blood film, and lead in the urine.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ULCERATIVE STOMATITIS IN CHILDREN, AND ITS TREATMENT.

DURING the war a form of stomatitis was described the causal organisms of which were the Vincent spirochaete and the fusiform bacillus; to this the name of "trench mouth" was given. This form of stomatitis has long been described in books on children's diseases under the term "ulcerative stomatitis." The treatment, however, which was extremely successful for "trench mouth" has not been applied, so far as I am aware, to children up to the present. This disease, which usually occurs after the primary dentition is well advanced, is common among the hospital class of patient, and is characterized by swelling, redness, oedema, and extreme tenderness of the gums round about the teeth. The gums may show actual ulceration. Those parts of the cheek which come in contact with the ulcerated areas may themselves show infection. The teeth are frequently carious; pressure on the gums may or may not cause pus to appear at their margins. The tongue is coated and the breath fetid; the temperature is generally raised to 101°; the child refuses food, and there may be swelling and tenderness of the lymphatic glands beneath the jaw at its angle.

Smears of the pus will usually show the fusiform bacillus and the Vincent spirochaete. The clinical picture is thus very like that of the so-called "trench mouth." The treatment which I have carried out in a large number of out-patients is as follows: The following mixture was applied to the mucous membrane of the gums, cheeks, and tongue at six-hourly intervals: liquor arsenicalis 2 drachms, vin. ipecac. 2 drachms, glycerin 2 drachms, aq. menth. pip. to 1 oz. As this mixture is poisonous, and could not be used as a mouth wash in small children, I ordered it in the following fashion: 15 drops diluted in 2 drachms of water were to be applied by means of a soft piece of muslin on the end of the finger or a camel's-hair brush. In children old enough to use this mixture as a mouth wash—that is, old enough to spit out the mixture after its application—a soft boiled toothbrush was used, a few drops of the mixture undiluted being applied to the gums by the toothbrush. The arsenic seems to be specific for the spirochaete and the vin. ipecac. for the fusiform bacillus.

In conjunction with this treatment, which was that recommended during the war for "trench mouth," potassium chlorate was administered, 12 grains in the twenty-four hours being given to children under 1 year, and 18 grains in the day to children under 2 years. In the administration of the potassium chlorate the child's meals were carefully

avoided, as it was found to tend to produce indigestion. Attention was paid to the general condition of the child, the diet being nutritious, and plenty of fresh air and fresh fruit were indicated.

The improvement with this treatment was rapid, the acute symptoms subsiding in thirty-six hours. There is, unfortunately, a tendency for this condition to recur. As it is extremely infectious, care should be taken to prevent other members of the family contracting the disease. Very often in my cases I found that one of the parents was suffering from the disease and had probably been the source of the infection.

DONALD PATERSON, M.B., M.R.C.P.,
Physician to Out-patients, Children's Hospital, Great Ormond Street.

ERYSIPELAS OF THE MOUTH.

CASES of erysipelas attacking the fauces are somewhat rare, and worthy of record.

Recently Mrs. L. was notified as a suspected case of diphtheria, but her throat had not been well seen by her medical adviser; he, however, gave her 2,000 units of antitoxin, and, as she was obviously very ill, requested her removal to hospital.

I saw her there; she had then been thirty-six hours ill, complaining of sore throat, a feeling of swelling in the throat, and difficulty in opening her mouth; the temperature was 104°; she was seven months pregnant. There was some enlargement of the cervical glands; her throat was congested and dark in colour; the fauces and tongue showed bullae. The next day the throat appeared somewhat better, the bullae on the tongue had burst, and ulcers to the number of about a dozen were counted on her tongue; there was some nasal discharge, and the temperature remained raised. When ill seventy-two hours the infection passed by way of lips and nose to the face, thence to the body, and finally ceased at the costal margins. Profuse desquamation ensued. The ulcers on the tongue gradually improved as the sloughs separated, and convalescence followed; pregnancy was not interrupted, and there were no complications.

EUSTACE THORP, O.B.E., L.R.C.S., D.P.H.,
Assistant M.O.H. Sunderland.

Reports of Societies.

THE PRESENT POSITION OF ORGANOTHERAPY.

AT a meeting of the Section of Therapeutics and Pharmacology of the Royal Society of Medicine on January 9th, with the President, Dr. W. LANGDON BROWN, in the chair, a discussion took place on the present position of organotherapy.

Professor SWALE VINCENT began with a criticism of the groundless and fantastic theories which surrounded this subject. It seemed that neither the scientific discrimination of the medical profession nor the common sense of the general public could yet be trusted. The doctrine and practice of organotherapy appeared to involve the therapeutic use of practically every organ and tissue in the body. Many foolish notions were abroad—one, for example, was that a preparation from the pancreas, tonsil, and duodenal mucosa, taken by the mouth, was a remedy for diabetes. A large number of substances were recommended for administration by the mouth, which, so far as could be discovered, produced no physiological effect of any kind when given in that way. He thought that when physicians insisted on giving substances by the mouth they should be called upon to defend their practice by proper clinical records of their cases. Substances which produced no effect when given by the mouth might have certain effects when given subcutaneously, but even then the effects were not specific, and were at best only temporary. In the whole province of therapeutics there were many fallacies and pitfalls, in particular the one expressed by *post hoc, ergo propter hoc*. It was truly said that it was a poor cure which never found its lucky patient. For various reasons, most of them obvious, treatment was often undertaken just at the time when things were at their worst, so that a turn for the better was put down to the credit of the treatment. Many patients recovered without treatment at all; when treatment was given it was by no means always certain that it had anything to do with the recovery, and in some cases the position might be that recovery took place in spite of treatment! But it seemed clear that, if the value of a remedy was to be ascertained and demonstrated, something like a series of experiments must be carried out. It would be presumptuous on his part, as one not in practice, to point out how a clinical worker should conduct his experiments, but at any rate the necessity of adequate and rigid controls should be urged. The endless records of single cases alleged to have been cured by this or that drug were not worth the paper on which they were written. That was true of general therapeutics, and truer still of organotherapy.

Passing to a more particularized review the speaker said that the value of thyroid preparations in myxoedema appeared to be established, and these preparations might be valuable under certain other conditions—in some cases of goitre, for instance, and in obesity. Many observers asserted that thyroid did good in quite a wide range of conditions, and it was, of course, conceivable that a drug which stimulated the chemical activities of the body might have many indications. Parathyroid had been used in different conditions, with very uncertain results; here he thought the most optimistic endocrinologist would make no very large claims. It had never been shown that treatment with pituitary extract had the slightest effect in remedying the symptoms due to pituitary insufficiency. The value of adrenaline medication bore a very problematic relation to the adrenal function, and here again, as in the case of extracts of the posterior lobe of the pituitary, there was no such thing as substitution therapy. In Addison's disease adrenaline preparations did not seem to be of the slightest value. As for testicular and ovarian medication, it was doubtful whether such preparations produced any effect when administered by the mouth; when administered subcutaneously a mild stimulant or irritant effect might be observed, which, however, was not specific, but was produced by many other substances. It was generally recognized that the pancreas furnished an internal secretion the elimination of which might give rise to a condition resembling the disease known as diabetes, but the administration of pancreatic extract had not been proved to be of any value in that condition. During recent months, however, the investigations undertaken at the University of Toronto (BRITISH MEDICAL JOURNAL, November 4th, 1922, p. 833, and November 18th, p. 991) made it seem necessary to revise this judgement. It would not be wise to be too sanguine, but it was not out of the question that, sooner or later, there might be a preparation from the pancreas which would have the same action in diabetes as thyroid had in myxoedema.

To sum up, if the search was for a true substitution therapy—the artificial replacement of an internal secretion—the reward was the solitary instance of thyroid, though it might be that before long the pancreas must be added. There were also a few instances in which substances were valuable as drugs, apart altogether from any question of the internal secretions—for example, adrenaline. On no subject was such utter nonsense talked as on the internal secretions, and organotherapy, or a large portion of it, might be defined as the application of this nonsense to practical medicine. In the meantime certain firms of manufacturing druggists were growing rich owing to the ignorance of the public and the lack of discrimination of the medical profession.

Professor G. R. MURRAY (Manchester) thought that a discussion on organotherapy at the present time would serve a very useful purpose. Certain lines of treatment by this means were based on sound physiological principles, although, owing to the enthusiasm of speculative writers, a great deal of ephemeral literature had appeared on the subject, much of it of no value, and some of it positively harmful. The term "organotherapy" might include the products of the secretory, excretory, and the incretory glands. The excretory glands, from the nature of their function, did not promise much help, though urea might be mentioned. The secretory glands were those which delivered their secretion through a duct to the surface of the skin or mucous membrane; the incretory or endocrine glands discharged their secretion into the blood, lymph, or cerebro-spinal fluid. He would confine his remarks to conditions in which the treatment was of value in clinical medicine. The first and most important use of the thyroid preparation was to supplement a failing thyroid gland, which, owing to fibrotic atrophy or other destructive lesion, could no longer provide even the minimum amount of hormone necessary. If a case failed to respond to the treatment it might be well to change the preparation, for he had come across preparations which had no activity at all, probably owing to some fault in the manufacture of the

particular sample, or possibly to the selection of the wrong gland—a contingency always to be borne in mind. When thyroid treatment was started there was a latent period of a week or more before any definite effect was observed. If any signs of hyperthyroidism were present, the use of thyroid extract was contraindicated, and this was an important point to observe before starting treatment in cases of simple goitre; as a rule, the pulse rate would give the indication. In simple obesity he had seldom found it beneficial unless combined with special dieting. In some menstrual disorders a beneficial action had followed quite small doses, and in tertiary syphilis also good results had been obtained. The function of the parathyroid glands had been under discussion for years; here he had had no personal experience. With regard to the suprarenals, it was known that Addison's disease was due to a destructive lesion of the glands, but the administration of whole adrenaline or any preparation of it was quite unable to revive the glandular function. He had never seen permanent improvement in Addison's disease by this treatment, though in other respects adrenaline presented an extremely valuable remedy on account of its action on the sympathetic nervous system. He had found it of value in the treatment of oesophageal spasm; it seemed as if the adrenaline was held up by the oesophagus, where it exercised possibly some local action, as very often immediately after a dose patients could swallow food with comfort. Extract of pituitary gland, given subcutaneously, was a valuable remedy. Its careful use had a well recognized place as a uterine stimulant in obstetric practice; it had been found useful also in the treatment of diabetes insipidus. Little evidence was available to show that either testicular or ovarian preparations had any value when taken by the mouth, and there was no clear proof that eunuchism could be removed by testicular preparations. The active principle of pancreatic incretion had long been sought, and the recent achievements of Banting and Best at Toronto were of great interest and encouragement. On the whole, it might be claimed that preparations of thyroid, parathyroid, pancreas, suprarenal, and pituitary glands were agents of value, though in other cases it could not fairly be said that it was known how to obtain or employ satisfactory preparations. The recent exploitation of organotherapy was deplorable, because it tended to discredit the proper use of these substances.

In acknowledging the President's thanks for having come from Manchester specially to address the Section, Professor Murray said that he felt that the work of the pioneers in organotherapy should always be gratefully acknowledged; he referred in particular to the work done by Sir Victor Horsley, who in the early days had shown the relation between thyroid and myxoedema.

The Clinical Use of Parathyroid.

Dr. W. R. GROVE (St. Ives) brought forward some clinical results of the administration of parathyroid, but he said that he did so with considerable trepidation after the remarks of Professor Swale Vincent. Nevertheless, his cases had been followed up very closely. His attention was drawn to parathyroid after he had been engaged over a long period in the study of calcium metabolism. In 1906 a colleague informed him of the good effect clinically of calcium salts in ulcers and other conditions. He confirmed these results in ulcers, and also in some eczemas. He also injected intramuscularly calcium chloride in single grain doses, diluted 1 : 100, for haemorrhages which could not be reached surgically. Therefore he came to the subject of organotherapy already a firm believer from clinical evidence in the effects of the administration of calcium salts both by the mouth and intramuscularly. Dr. Vines of Cambridge, who knew of his interest in calcium metabolism, asked him to collaborate with him from the clinical side in certain investigations.

The first case taken was a woman, aged 55, prematurely old, with a large varicose ulcer of the leg. She was calcium deficient, and on calcium chloride being given intramuscularly at weekly intervals the calcium content of the blood increased, though it never reached more than 80 per cent. of the normal, and an improvement in the ulcer synchronized with the higher calcium content of the blood. The injections were stopped for three weeks while calcium was given by the mouth, and the ulcer then increased in size.

Some half-dozen other cases, all of them showing calcium deficiency, were by this time under treatment, and all of them improved with intramuscular injections, though they never reached normal, while calcium by the mouth was followed by no signs of improvement in the blood, and very little in the ulcer. It was in this series of cases that the administration of parathyroid was then begun, in 1/10 grain doses daily. In every case the blood rapidly became normal, never taking more than a fortnight to do so, and the ulcers started healing. At the end of five weeks from the commencement of the parathyroid treatment the first and most obstinate case, in which the ulcer had completely encircled the leg, and which had gone on with varying results for two hundred days under calcium chloride treatment, was completely healed, and in the smaller ulcers in other cases the healing was still more expeditious. A number of related conditions had been tried and had yielded good results under parathyroid treatment. These included bed sores and severe burns. All diseases in the rheumatic group invariably showed calcium deficiency, and in every case of this kind treated there were undoubted signs of improvement after administration of parathyroid. A gumma of the face gave a remarkable reaction to parathyroid after the case had resisted ordinary antisyphilitic treatment for months. Another striking success was in a case of herpes zoster of the conjunctiva with iritis. In pernicious anaemia there was a hopeful field. He had also seen about a dozen cases of enlarged prostate, all with calcium deficiency, which had shown most striking results on treatment with parathyroid. One patient who had lived a catheter life for three months was able to do without the catheter, and was only disturbed once or twice in a night. It seemed to him that calcium deficiency was an index of the absorption of a toxin, and that many chronic diseases were due to the breakdown, in consequence, of the defences of the body, the controlling mechanism being situated apparently in the parathyroid glands. If the focus of the disease itself could not be removed, parathyroid was only an alleviative agent, but nevertheless a valuable one.

Dr. HOWARD VINES (Cambridge), who was asked to supplement Dr. Grove's account of his work, said that in all these cases in which good effects were observed in parathyroid treatment the underlying condition was sepsis, which accounted for a large number of the diseases set out in separate paragraphs in the medical textbooks. In three or four cases he did white blood counts during the period of parathyroid treatment, and found the polymorphonuclears go up considerably, along with the improvement in the patient's condition. Parathyroid brought about a stimulation of leucocytic activity; he did not suppose that this had anything to do with a direct action of the parathyroid substance on the leucocyte-producing centres, and it seemed to him a much more rational idea that it was brought about by the calcium of the blood plasma. Dr. Grove's statement of cases might sound as though a panacea had been discovered, but the story at bottom was simple: it was a matter of increasing the physical resistance to bacterial infection.

The Action of Ovarian Extract.

Dr. W. E. DIXON (Cambridge) gave an account of some work not yet published. He said that Harvey Cushing first made the observation that pituitary extract was secreted into the cerebro-spinal fluid. Thereafter three or four other observers stated definitely that they had not been able to find pituitary present in that fluid. Experiments on this point in his own laboratory were performed principally on dogs and on a few cats. A cannula was put into the cerebro-spinal canal high up, all the experiments in which the cerebro-spinal fluid was blood-stained were discarded, and the action on the guinea-pig was tested, every known test being made for pituitary. In the result they succeeded in obtaining pituitary extract in the cerebro-spinal fluid in practically every instance. Different specimens of the fluid yielded different amounts, which was not extraordinary, because the needs of the body would naturally determine the amount present. The object of the experiments was to determine what substances could increase the action of pituitary in the cerebro-spinal fluid. Here the experiments yielded a mass of negative results, and the only substance which invariably produced an increased secretion of pituitary immediately (the secretion only lasted from one to two minutes, after which the normal condition was resumed) was ovarian extract. The ovarian extract was boiled and filtered, and the filtrate injected into a vein. The cerebro-spinal fluid, which was being collected all the time, immediately after this injection produced an increase—in some cases a very large increase—of pituitary extract. Orchitic extract did not produce any effect, but extracts of duodenum or small intestine, boiled and filtered in exactly the same way, similarly increased the secretion of pituitary extract, though not immediately; there was a long delay—perhaps an hour—before any marked increase in the

pituitary secretion took place. One naturally looked to the alimentary canal for an explanation of this phenomenon. The first suggestion was that it might have something to do with facilitating absorption from the alimentary canal, but there was no increased absorption at all. The absorption remained quite constant, but he noticed that pituitary increased the tone of the whole intestine.

Dr. W. LANGDON BROWN said that the discussion had been most interesting, none the less because Professor Swale Vincent had opened it with a refreshing dose of scepticism. It was quite time that they should be reminded of the need for studying the underlying physiological basis for all this work, and should take a little more careful stock of the evidence for and against any particular diseases being associated with endocrine defects and of their possibilities of remedy by organotherapeutic means. Organotherapy was lagging some way behind the observations made in endocrinology. It must be admitted that the basis upon which the clinical observations had been made was in many instances not as satisfactory as could be wished. At the same time the observations which Dr. Grove and Dr. Vines had brought forward that evening showed that evidence was available by clinical means, apart from ordinary physiological laboratory experiments, which would meet all the tests that could be asked of it. The observations mentioned by Dr. Dixon were very important as showing that there was something in the ovary which definitely stimulated the pituitary gland. Therefore he did not think one could possibly take up so negative a position as Professor Swale Vincent had done. Professor Vincent had carried the negative position too far. The speaker went on to refer to the observations on glycosuria in pregnancy, where the blood-sugar curve, demonstrated by Mackenzie Wallis, had been shown to be exactly the same type of curve as the one given in pituitary lesions, suggesting again some connexion involving ovary and pituitary. He mentioned two cases in which he had used ovarian extract, and in which the evidence pointed to a definite effect.

A woman, aged 20, had an artificial climacteric induced by the removal of both ovaries and tubes for tuberculous disease. She began to put on weight, which was not unexpected, and she had also curious seizures, attacks of choking, with quickening of pulse and respiration, each attack lasting about six minutes, and resembling some kind of minor epilepsy. Her thyroid swelled up during the attack, and she passed a little sugar after the attack. She was given ovarian extract, and whereas she had previously had three or four attacks a week she had had only one attack since last Easter. This patient was first observed under hospital conditions; she did not know what she was taking, and no attempt was made to suggest strongly that it was going to have a remarkable action.

The other case was one of thymic asthma. A number of remedies had been tried, and the attacks continued to be quite frequent. After ovarian extract was given they became less frequent, and were now rare.

He did not think there was any improbability in the supposition that some preparations of ovarian extract had therapeutic effects, but he himself had approached this question as a sceptic, and he still recognized that it was necessary to look to the basis of the clinical observations very thoroughly.

Professor SWALE VINCENT said that he had given in his paper a list of a large number of drugs which, he suggested, were useless or practically so. The only one in that list which had been challenged in the discussion was parathyroid, about which very little was known. He could not discuss the clinical evidence in its favour brought forward that evening, but his general thesis, which he still maintained, was that he would not expect anything to produce a pharmacological effect which had no physiological action. A man could not be cured by any means which would not also kill him. In the case of thyroid there could be "kill" as well as "cure." In the case of parathyroid he still—humbly, as became one not engaged in practice—reserved his opinion until a number of other cases were available. As for ovarian extract, this was the first time he had heard it authoritatively stated that ovarian extract had any effect which could not equally be got out of the big toe or any other part of the body. The President had hinted that he (Professor Vincent) did not give due credit to clinical observations. All he had said was that clinicians would have to be a little more scientific in the way they gave their evidence. Proper controls often were not taken, and the records furnished no idea of the precise conditions under which the treatment was given. He would not presume to deny that results followed the use of ovarian extract. He only took the liberty of saying that they were not proven on the evidence which so far he had had an opportunity of examining.

CHRONIC INTUSSUSCEPTION IN CHILDREN.

A MEETING of the Liverpool Medical Institution was held on January 4th, with the President, Professor J. HILL ABRAM, in the chair, when Mr. R. C. DUN read a note on chronic intussusception in children. He referred to ten cases, all of which were operated on and recovered. In no case was there any difficulty in reduction and no adhesions were found. The average age of the children affected was 5 years. The duration of symptoms was from four weeks to two and a half years. An abdominal tumour was felt in six out of the ten cases. Blood and mucus were passed per rectum in only two of the cases, and in no case was complete obstruction reached. In none of the cases was any definite pathological condition found which would account for the formation of the intussusception.

Mr. J. T. MORRISON, referring to two cases recently seen by him, said there were cases with borderline symptoms between the acute and chronic types. One such, a boy aged 18 months, having previously had a typical ileo-caecal acute intussusception, was again seized with a similar attack. Operation showed a pure colic intussusception easily reducible and without oedema or congestion. The other case, a boy aged 5 years, had symptoms of acute obstruction of a definite but not very severe type, necessitating immediate operation. There was no blood or mucus, but a vague tumour was present in the right side of the abdomen. Previous health had been excellent. At operation a very easily reducible intussusception of the ileo-caecal type was found. There was practically no oedema of the apex. During convalescence he had an attack of fever (104°) of one day's duration, with blood and mucus in the stools. Otherwise there were no further symptoms. Was this, he asked, an abortive attack of intussusception or merely an attack of enteritis?

Night Blindness.

Mr. H. HAWARD BYWATER read a short paper on night blindness. He divided the subject into two groups: (1) the congenital and hereditary forms, (2) the acquired varieties. The first group comprised the rare congenital form with normal fundi, which was stationary, and the three hereditary conditions: (*a*) retinitis pigmentosa (and its non-pigmentary form), (*b*) retinitis punctata albescens, and (*c*) gyrate atrophy of the retina and choroid (which were progressive). The second group comprised: (*a*) acquired retino choroiditis (syphilitic, which became stationary if treated), (*b*) epidemic night blindness (this, the most important form, might or might not be associated with xerosis of the conjunctiva), and (*c*) physiological night blindness of the one eyed, as described by Thomson Henderson. After giving reasons why myopes and hypermetropes had difficulty at night, Mr. Bywater gave particulars of seventy cases of night blindness seen in Salonica by Major Usher and himself in 1917, with the tests applied. He mentioned that fourteen out of seventy were men who had useful vision only in one eye; he also described cases of the epidemic form occurring in miners during the last coal strike and xerosis in children. After briefly discussing the theories of night blindness he described experiments to prove that visual purple formation was carried out by the eye itself independent of the central nervous system. Changes in the visual purple appeared to be due partly to ultra-violet rays of greater length than 300 microns and partly by rays of the visual spectrum. Experiments to show the protection given by the media of the eye against the harmful rays of bright light were described; finally, the diagnosis and treatment of the different varieties were summarized.

Dr. A. E. BURROUGHS considered the most interesting aspect of night blindness was the congenital stationary type—that in which night blindness existed along with no other apparent abnormality of the eyes. This was purely hereditary and occurred in families often throughout many generations. A very full account, giving very extensive family trees of affected families, had recently been issued from the eugenics laboratory of Professor Karl Pearson. A type had appeared in which the female members of a family escaped but passed it on to the males. The affection was supposed to be rare, and in its higher degrees he believed it was so, but he had come across many cases of modified congenital stationary night blindness, especially noticeable during the time of the lighting restrictions in the war.

Dr. T. W. WADSWORTH described a case of syphilis of the lung. The patient was aged 17 years, and complained of cough and slight expectoration for six months. She was poorly nourished, her fingers clubbed, incisor teeth notched, the Wassermann reaction positive, the sputum negative as regards tubercle bacilli. There was an area of dullness just below the inferior angle of the left scapula. The breath sounds were bronchial in this area, and there was pectoriloquy and crepitations. *X*-ray examination of the chest showed a shadow corresponding to the area found clinically. After treatment with iodides and mercury and an injection of 0.3 gram novarsenobenzol the physical signs cleared up, and *x*-ray examination of the chest demonstrated that the opaque area had almost vanished. From the evidences of syphilis, the absence of tubercle bacilli, and the response to treatment, the diagnosis was established.

Dr. A. DOUGLAS BIGLAND read a note on the diagnosis and treatment of migraine, in which he advocated the administration of calcium salts.

DIATHERMY IN SURGERY.

AT the last meeting of the Brighton and Sussex Medico-Chirurgical Society Dr. H. T. CUBBON read a paper on the use of diathermy in surgery. He gave a general outline of the physical effects produced by the passage of the diathermy current through the body, with special reference to the destruction of morbid tissue by the heat produced. Specimens of meat were shown in order to demonstrate this. Dr. Cubbon then gave a short description of the technique of a diathermy operation. The destruction of tissue by diathermy being the result of coagulation, there should be no haemorrhage; this was a great advantage to the patient and surgeon. The risk of haemorrhage was dealt with and the means of avoiding it by careful attention to technique.

The advantages of diathermy over ordinary surgical procedures were summarized and discussed under the following headings:

1. Lack of primary haemorrhage.
2. Absence of shock and pain.
3. Relief of pain in palliative operation.
4. Diminished risk of cell implantation.
5. Sterilization of the parts operated upon by the heat produced.
6. Firmer, denser, and more pliable scar from diathermy, with less tendency towards breaking down.
7. The method of choice in patients too old or feeble for operation by other methods.
8. The patient more willing to undergo further applications where necessary, because of the simplicity of the operation and the few after-effects.
9. Rapid convalescence.

The complications which might arise after diathermy operations were discussed; these included oedema and risk of obstruction in laryngeal operations and risk of secondary haemorrhage. Practically all cases of malignant disease involving the tongue, the floor of the mouth, palate, fauces, and certain parts of the pharynx, vagina, and vulva were suitable for diathermy. Fibromata of the nasopharynx, papillomata of the bladder, cavernous naevi of the tongue, lips, pharynx, and buccal mucous membrane were cited as non-malignant pathological conditions which could be destroyed by diathermy with excellent results. Dr. Cubbon added that warts and small pigmented areas of skin could be effectively destroyed by diathermy sparks; strictly speaking, this was not diathermy, but the sparks produced by the diathermy auto-condensation method were so much less painful than the older high frequency sparking that very often tissue could be destroyed without the use of a general anaesthetic. Most of the cases of malignant disease which had been operated upon by diathermy were those considered inoperable from the ordinary surgical standpoint. These cases had been naturally far advanced and cures could not be expected, but in spite of that the results had been distinctly encouraging. In operating on all early cases of malignant disease of the mouth and upper air passages diathermy, in view of its advantages, should be considered the method of choice. Diathermy was no more a specific for the cure of malignant disease than operation, but a combination of the two would be an immense help to the surgeon.

Mr. M. FITZMAURICE-KELLY showed four cases, all of which had been successfully treated by diathermy by Dr. Cubbon and himself.

Mr. ROBERT SANDERSON read notes of a case of subinvolution of the uterus, and of a case of malignant annular stricture of the colon.

Reviews.

THE ADMINISTRATION OF ANAESTHETICS.

THE fourth edition of HEWITT'S *Anaesthetics and their Administration*[1] was published in 1912 before the lamented death of its original author, and it is timely and fitting that the work should be brought up to date in view of the general advances made both in the scientific and in the practical part of the art of anaesthesia during the past few years. Dr. HENRY ROBINSON, who was also the editor of the last edition under the immediate personal supervision of the late Sir Frederic Hewitt, is now entirely responsible for the clinical chapters, and has almost entirely rewritten them. Mr. Digby Cotes-Preedy has again contributed the chapter on the medico-legal aspects of surgical anaesthesia, and Dr. A. J. Clark, Professor of Pharmacology at University College, London, has now undertaken the responsibility of revising the two chapters dealing with the physiology of anaesthesia.

The book commences, as formerly, with a chapter on the evolution of surgical anaesthesia; the second chapter is devoted to the properties and impurities of the chief agents capable of producing general surgical anaesthesia. The selection of anaesthetics, the extraneous circumstances of anaesthetization, and the use of morphine and other alkaloids in conjunction with anaesthetics are then considered. After accounts of the administration of the principal anaesthetics, mixtures of general anaesthetics are discussed; sequences and alternations of general anaesthetics are next described, and then local and regional anaesthesia. Spinal anaesthesia has a chapter to itself; minor difficulties in anaesthetization, the cause and treatment (preventive and immediate) of respiratory arrest and of circulatory failure, and the after-condition of the patient are discussed, and an adequate index has been provided.

The chapters devoted to the physiology of anaesthesia are a masterly synopsis of a difficult subject. Professor Clark has succeeded in making interesting a subject which tends to be "dry" as well as difficult. His explanations are clear and concise, and his illustrations equally clear and well chosen. After defining anaesthetics he discusses the six theories as to their mode of action, and comes to the conclusion that the drugs act by decreasing the permeability of the cells, though the exact mode of this action is still uncertain. He deals next with the absorption, excretion, and distribution in the body of anaesthetics, and, after touching on shock and its treatment, brings his excellent little monograph to a close by consideration of each of the principal anaesthetics in turn.

For the work of the general editor we have nothing but praise, even though we are inclined to quarrel with him over minor points. For example, on page 143 the case reported by Dr. Guthrie really has nothing to do with the question of nitrous oxide and ether in cases of cardiac affections mentioned in the previous paragraph, though the juxtaposition of the two paragraphs makes it appear as though there was some connexion. Again, he recommends on page 257 the addition of rubber cushions to Trewby's apparatus for combined nasal and oral administration of nitrous oxide and oxygen, thereby doing away with one of the claims the inventor made for his instrument, that of being readily cleansed even by boiling; it is an addition which is, in practice, rarely necessary if the nose and mouth pieces are properly made. It is also a blemish that the instrument figured is not the one used for nitrous oxide and oxygen administration as stated beneath the illustration, but the one for nitrous oxide and air. Omissions are few, but in a future edition it might be as well to figure the double bottle modification of Junker's inhaler, in which, no matter how the connecting tubes are joined up, chloroform cannot reach the patient in the liquid state.

The book is excellently printed on good paper, and the illustrations throughout are adequate and well reproduced. Altogether it can be recommended both to the practitioner and the student.

[1] *Anaesthetics and their Administration.* A textbook by the late Sir Frederic W. Hewitt, M.V.O., M.A., M.D. Fifth edition. Edited by Henry Robinson, M.A., M.D., B.Ch. Oxford Medical Publications. London: Henry Frowde, and Hodder and Stoughton. 1922. (Demy 8vo, pp. xiii + 576; 83 figures. 30s. net.)

SURGICAL ANATOMY.

THE second edition of the excellent *Manual of Surgical Anatomy*[2] by BEESLY and JOHNSTON differs only slightly from the first. The section on nerve injuries has been rewritten, and provides a useful summary of the recent advances in this subject; a few other additions and alterations in the letterpress and in the illustrations have been made. As was said in the review of the first edition, the authors have succeeded in compiling a full but concise account of the surgical anatomy required for the higher examinations; and the popularity of the book with students and graduates proves that it has fulfilled its purpose. The arrangement follows the plan of Cunningham's *Practical Anatomy*. The book is intended by the authors to be used in the dissecting room; but it will be found just as interesting and clear to read in the study. The sections on joints are really excellent, and the description of the anatomical relations of the joints in disease, and the various ways of surgical approach, is the most illuminating that we have read in a small textbook; we especially commend the pages dealing with the knee-joint and its derangements. The illustrations, many of which are familiar, are clear and to the point, and the printing is excellent.

The third edition of the *Manual of Surgical Anatomy*,[3] by Mr. CHARLES R. WHITTAKER of Edinburgh, has been considerably enlarged, and the number of illustrations has been more than doubled. Considerably more attention is paid to the anatomical descriptions, which are excellent, than to surgery. There is, indeed, throughout the book a lack of emphasis on the surgical applications to anatomy. The manual is full of tables and diagrams, all of which are clear and should prove useful. The print is large and clear, and there is an efficient index. This book should serve its purpose of helping the student in revising his work for his qualifying examination.

VISCERAL NEUROLOGY.

THE first edition of Dr. F. M. POTTENGER'S *Symptoms of Visceral Disease*[4] was reviewed in the BRITISH MEDICAL JOURNAL in 1920 (vol. ii, p. 861). A second edition has now appeared in a somewhat expanded and modified form. Though for more than twenty years devoted to the study of chest disease the author pleads for the unity of medicine and deprecates specialism, whether of the laboratory, such as bacteriology, metabolism, and biochemistry, or clinically of particular parts of the body, and insists that the great requisite of modern medicine is accurate clinical observation and interpretation carried out with the same care that the laboratory worker has developed in his department of work. Emphasis is also laid on the need to pay attention to the individual sufferer and not only to the "disease which has the patient." In many respects this argument resembles that of Sir James Mackenzie, but Dr. Pottenger came independently to the conclusion that most symptoms are due to altered nerve and endocrine activity. Disease expresses itself physically and psychically: physically mainly by reflex action through the vegetative nervous system, some stimuli acting chiefly on the sympathetic and others on the parasympathetic division; psychical disturbance, depending on fatigue and irritability of nerve cells, occurs in both acute and chronic diseases and is shown by neurasthenia and psychasthenia.

A rational classification of the symptoms of inflammatory affections of the viscera is suggested under the heads of those due (1) to toxaemia, such as malaise; (2) to reflex action—for example, cough in pulmonary tuberculosis; (3) to the disease *per se*; and (4) those appearing when the disease is well established; this grouping emphasizes the unity of the body, the interrelationship of the various viscera, and the widespread disturbance that may follow a single stimulus. The visceral reflex is discussed and two chapters are devoted to reflexes, the afferent impulses of which course in the sympathetic and in the parasympathetic nerves respectively. Stress is laid on the viscerotrophic reflexes, and as an example of those due to the sympathetic the muscular wasting of the chest wall in pulmonary tuberculosis is given. The interesting suggestion is made that tuberculous infection of the larynx, which is most apt to occur on the side corresponding to the lung mainly affected, is favoured by the parasympathetic reflex. The author describes the sympathetic system as protecting the individual against outward enemies, whereas the parasympathetic maintains the organism as an individual. The syndromes of these two portions of the vegetative nervous system are then briefly sketched. In the third part of the book, which deals mainly with the anatomy and physiology of the vegetative nervous system, the opinion is expressed that too much stress has been laid on the effect of adrenaline, atropine, pilocarpine, and other drugs in the differentiation of vagotonia and sympatheticotonia. The second and larger part of this work deals seriatim with the nerve supply of the viscera and touches on the clinical aspects of the more important viscerogenic reflexes. The author has evidently worked hard at a difficult subject, and, though the book, as pointed out in our review of the first edition, is not attractive to read, it cannot fail to be useful as a source of reference.

PHYSICAL METHODS IN THE TREATMENT OF CIRCULATORY DISORDERS.

PHYSICAL methods in the treatment of diseases of the circulatory system have never been so popular in this country as on the Continent or in America, though graduated exercises have been extensively used in the treatment of the effort syndrome. Drs. MATHIEU, RICHARD, and HARANCHIPY, in their little book on the treatment of cardio-vascular diseases by massage, movements, and other physical agents,[5] state that, while many of the larger treatises on medicine recommend these methods, few give sufficient details, and the practitioner is thus apt to hand over his patients to those who specialize in this line. The book is intended to obviate this, and to suggest methods which can be adopted without the aid of a trained masseur or of any elaborate apparatus.

After a brief summary of the physiology of the circulation and the general effects which might be expected to follow from mechanical measures, the main portion of the book deals in detail with the technique and application of the various forms of massage, passive and active movements, hydrotherapy, electrotherapy, and of heat and light baths, in their relation to the circulation. The instructions are given in clear and lucid terms so that anyone making use of these forms of treatment will not be left in doubt as to the authors' intentions. In the concluding part of the book various cardiac and vascular disorders are discussed and the appropriate therapy suggested.

One hesitates to share fully the optimism which seems to be possessed by the writers in anticipating the results of their methods; but the book itself is well worthy of perusal by those who are interested in this branch of medicine, and fills a useful gap in knowledge.

NOTES ON BOOKS.

THE issue of a fifth edition of Mr. CLAUD WORTH'S book on *Squint*[6] is sufficient evidence of its usefulness. It is deservedly well known as a clear and sufficient statement of the general conditions which bring about this deformity and defect of vision, and the means which may be adopted to correct it. This latest edition does not differ materially from the earlier. The author emphasizes his experience that "of the cases of squint in which efficient treatment is carried out from the first appearance of the deviation, only a small proportion will ever need operation. Operation is required in the majority of the neglected or inefficiently treated cases." He records an alteration in his methods: he now seeks to obtain the full effect he desires by advancing one muscle only, and considers that the combined operation, that of advancing one muscle with tenotomy of the antagonist, is unsatisfactory. He discusses newer methods, such as folding or reefing, and partial tenotomy, but is not favourably impressed by them.

---

[2] *A Manual of Surgical Anatomy.* By L. Beesly, F.R.C.S.Edin., and T. B. Johnston, M.B., Ch.B. Second edition. Oxford Medical Publications. London: H. Frowde, and Hodder and Stoughton. 1922. (Cr. 8vo, pp. xlv+561; 160 figures. 18s. net.)

[3] *A Manual of Surgical Anatomy.* By C. R. Whittaker, F.R.C.S.Edin., F.R.S.E. Third edition, revised and enlarged. Edinburgh: E. and S. Livingstone. 1921. (Cr. 8vo, pp. 240; 50 figures. 15s. net.)

[4] *Symptoms of Visceral Disease.* A Study of the Vegetative Nervous System in its relationship to Clinical Medicine. By F. M. Pottenger, A.M., M.D., LL.D., F.A.C.P. Second edition. London: Henry Kimpton. 1922. (Med. 8vo, pp. 357; 86 figures, 10 coloured plates. 28s. net.)

[5] *Traitement des Maladies Cardio-vasculaires par le Massage, le Mouvement et les Agents physiques.* By Drs. P. Mathieu, G. Richard, and Haranchipy. Paris: Librairie Octave Doin. 1922. (Cr. 8vo, pp. 144; 1 figure. Fr. 5.)

[6] *Squint: Its Causes, Pathology, and Treatment.* By Claud Worth, F.R.C.S. Fifth edition. London: Baillière, Tindall, and Cox. 1921. (Demy 8vo, pp. 239; 42 figures. 12s. 6d. net.)

It is but a little while since we noticed the second edition of *Tidy's Synopsis of Medicine*,[7] and now a third has appeared, testifying to the popularity of this book among students preparing for their final examination. The introduction of several new articles has added 30 pages to the work, which now consists of nearly 1,000 pages. In revising it for future editions Dr. LETHEBY TIDY would, we think, be well advised to keep within that limit, since the book is not intended as a substitute for the larger treatises on internal medicine. One or two omissions, noted in our review of the second edition, have now been rectified, notably by the inclusion of an account of protein hypersensitiveness in relation to asthma and of Vincent's angina. Altogether, the work continues to deserve high praise for its comprehensiveness and accuracy and for the skill shown in arranging and compressing the material. Its success seems now assured.

When he has recovered from his surprise at being told in one and the same breath that while it is obvious that the same equipment is not suitable for all requirements, yet, none the less, an equipment can be, and frequently is, assembled which will answer all and every purpose efficiently and well, the dentist who wishes to take his own *x* rays will find the first four chapters of Mr. KEMPSTER'S *Dental Radiology*[8] a most useful guide both as to outfit and practical working. It may, however, be pointed out that Figs. 16 and 18—"too high" and "correct" positions of tube—being printed the one across and the other along the long axis of the page, are not quite suitably arranged for comparison. A chapter is devoted to the interpretation of dental radiographs, but we fear that the dentist will not reap from its perusal as much benefit as he might reasonably expect. There seem to be too many examples of the same condition, and in too many cases we cannot make figure and description agree with each other (for example, Fig. 59.3, 61.4). The meaning of the diagrammatic figures of "pyorrhoea" on page 146 is not easy to discern. We cannot gather the difference between "periodontal thickening" and "pericemental thickening," either from letterpress or illustration. Perhaps in another edition the author will supply the deficiency of illustrations of such conditions as fracture, dislocation, foreign bodies, isolated foci of infection, exostosis, and necrosis. The two concluding chapters on localization and protection of the worker are brief but practical.

The British Journal Photographic Almanac[9] for 1923, edited by Mr. GEORGE E. BROWN, F.I.C. (the sixty-second issue), is on the same lines as those of late years. The advertisements of everything bearing on photography are such a feature of this annual that it may be truly said that nothing photographic is omitted; we should take it that every photographic firm and every photographic appliance is somewhere recorded in these pages. The list of photographic societies of the United Kingdom, it may surprise some to be told, contains the names of close on five hundred. The book proper is introduced by an article by the editor on "What camera and lens to have"; the advantages and disadvantages of all sorts of cameras are discussed and contrasted. Stand cameras, hand cameras, box cameras, reflex cameras, all are reviewed, as are plates as against film packs or roll films, the various types of lenses, their focal length, and so on; shutters, and various accessories. Shortly and concisely this article furnishes an amount of useful information which should be of the greatest help in "buying a camera." There follows an epitome of progress which deals with the events of the year, with apparatus and equipment, with lenses, and with photographic processes of all kinds. Finally, a large section deals with the formulae of developing solutions, fixing solutions, hardening and clearing solutions, negative intensifiers, and so on. No photographer, amateur or professional, can afford to be without this almanac; there is a good index, and the amount of information it contains on photographic matters is prodigious.

Dr. THOMAS S. CULLEN has collected and bound together reprints of papers by members of the Gynaecological Department of the Johns Hopkins Hospital and University published during the years 1916 to 1922,[10] and has provided a table of contents.

[7] *A Synopsis of Medicine.* By Henry Letheby Tidy, M.A., M.D., B.Ch. Oxon., F.R.C.P.Lond. Third edition, revised and enlarged. Bristol: John Wright and Sons, Ltd. London: Simpkin, Marshall, Hamilton, Kent, and Co., Ltd.; Toronto: The Macmillan Company of Canada, Ltd. 1923. (Cr. 8vo, pp. xv+985. 21s. net.)

[8] *Dental Radiology.* By Christopher Kempster, M.R.C.S., L.R.C.P. London: The Scientific Press, Ltd. 1922. (Cr. 8vo, pp. 184; 78 figures. 10s. 6d. net.)

[9] *The British Journal Photographic Almanac*, 1923. Edited by George E. Brown, F.I.C. Sixty-second issue. London: H. Greenwood and Co., Ltd. 1923. (Cr. 8vo, pp. 606; illustrated. Paper, 2s.; cloth, 3s.)

[10] *Collected Papers of Members of the Gynecological Department of the Johns Hopkins Hospital and University, 1916 to 1922.* (Roy. 8vo.)

THE MEDICAL RESEARCH COUNCIL.

ANNUAL REPORT.

THE annual report of the Medical Research Council for the year ended September 30th, 1922, has been issued this week.

Introductory.

The grant-in-aid at the disposal of the Council during the current financial year was £130,000, the same as in the preceding year; in this amount was again included the cost of the work of the Industrial Fatigue Research Board, and of the research work into mental disorders done on behalf of the Board of Control for England and Wales, and certain pathological inquiries conducted in Scotland for the corresponding authority there.

The Council has again been compelled to restrict very closely the work it undertakes or subsidizes at many points where increased development would have been highly desirable had funds permitted. Periodic conferences are now held at least once a quarter between representatives of the three departments chiefly concerned with the allocation of moneys voted by Parliament to scientific inquiry—namely, the Development Commission, the Medical Research Council, and the Department of Scientific and Industrial Research. The conferences are attended also by a secretary of the Royal Society, in so far as its interests, whether those in relation to the Government grant it receives for research or funds of other kinds, may be affected by, or have a bearing upon, polices or programmes of the three research departments.

Reference is made in the report to the International Conferences of the Health Section of the League of Nations[1] to further the establishment of an international system of common standards for estimating therapeutic serums and other substances used in medical practice or medical research which are susceptible of measurement only by indirect biological methods. Great Britain is alone among the great nations in having no system of standards and no machinery for selecting or adopting any standard of value for a given substance, but is still dependent on the United States or Germany. It is noted that as a result of the conference in Paris last November an agreement has been reached by which the standards formerly laid down for diphtheria and tetanus toxins (and antitoxins) by France, the United States, and Germany have been recommended for adjustment and general international adoption.

The Council has been able, speaking generally, to assist in a variety of ways the large body of research work done by devoted workers at many places. The report pertinently observes that "It is only by steady growth of the whole body of sound knowledge, through labours of which the methods and results are not easily understood and appreciated by the people, that practical fruit can be gathered from time to time in the better attainment of health under modern conditions of life and in the better control of disease. In maintaining and more effectively directing the support which they have been enabled to supply in aid of this scientific work the Council have again been under very heavy obligation for the abundant and ungrudging help they have received from the numerous scientific men who assist them in committees."

In a paragraph dealing with cancer the report states that the Council in framing its scheme of work has not encroached upon the work being done for the Imperial Cancer Research Fund and at the Middlesex Hospital, but has arranged schemes described in more detail below for the utilization at various selected hospital centres of the radium held by the Council for the Government.

The problem of the filter-passing virus is being investigated at the National Institute for Medical Research by biochemists, physicists, and pathologists, in association with work arranged at fever hospitals under the Metropolitan Asylums Board and elsewhere. Reference is made to the investigations in this direction by Dr. Gordon of St. Bartholomew's Hospital. With regard to influenza and common colds, it is observed that the latter not only regularly inflict widespread suffering and great economic loss, but have undoubtedly a very high mortality, though it be in large part concealed or indirect. One difficulty encountered in the laboratory investigation of influenza is the doubt whether the disease is transmissible to other animals than man; in this connexion the Council has made arrangements for an experimental study of distemper in dogs, which there is good reason to think offers

[1] BRITISH MEDICAL JOURNAL, December 17th, 1921, p. 1019, December 24th, p. 1080, and December 16th, 1922, p. 1180.

a close parallel to human influenza. Towards the cost of this investigation independent financial support is assured. This inquiry affords an illustration of the close relations between animal and human diseases. Studies of naturally occurring animal diseases have already assisted human medicine, and it is not to be doubted that their more regularized and systematized investigation by well trained and adequately paid research workers will produce results of value which at present can only be guessed. Another instance is afforded by tuberculosis; a committee of the Council has been working at improved methods for applying tuberculin tests in cattle. Again, the occurrence of the outbreak of botulism at Loch Maree last August has raised the question of its possible relation to grass sickness, which has been prevalent among horses in Scotland; work done in 1918 for the armies in France gave important guidance towards the provision of an antitoxin obtained from horses for the cure of grass sickness. The concluding paragraph of the report refers to the treatment of diabetes by extracts of pancreas, as described in our columns from the Physiological Department of the University of Toronto by Professor J. J. R. Macleod and Dr. F. G. Banting and his fellow workers. The Medical Research Council accepted the offer of the University of Toronto to control the patent rights in this country, and has taken measures for the encouragement and support of research work within the National Institute and at several hospitals in London and elsewhere with a view to making a supply of insulin available for use in this country as rapidly as possible, and promoting further improvements in its production and therapeutic use. "It must be gratifying," the report states, "to many that this success has come within one of the Canadian medical schools, of which the development and growth in recent years has been so notable, and that so conspicuous an achievement should have come from a group of young men whose eager military service during the war must at many points have brought handicap to their scientific work."

THE NATIONAL INSTITUTE FOR MEDICAL RESEARCH (HAMPSTEAD).

In the Department of *Biochemistry and Pharmacology* Dr. Dale and Dr. Lovatt Evans have completed their work on the influence of carbon dioxide upon the maintenance of normal blood circulation, and have shown that carbonic acid exerts a specific action on the tone of the vasomotor centres. Dr. Burn's work on the relation of the sweating produced by the drug pilocarpine to the integrity of the nerve supply of the sweat glands has shown that the diminution or suppression of the sweating response, which attends the degeneration of the sensory nerve fibres to the skin area in question, is the result of defective blood circulation, caused by the loss of sensory fibres, a conclusion which raises issues of great importance concerning the so-called "trophic" or nutritive influence of sensory nerves. Dr. Dudley's work, designed to isolate the active principles of the pituitary gland in pure form, has yielded valuable information about the properties of this hormone, but has led to the conclusion that the active principles cannot be directly isolated and identified in a pure form by the methods at present available. Dr. King has completed a study of stereo-isomerism in the cinchona alkaloids, and has been engaged in investigating the active alkaloid of poisonous toadstools.

The staff of the *Experimental Pathology, Bacteriology, and Protistology* Department has been increased by the appointments of Dr. P. P. Laidlaw and Dr. W. J. Purdy. Dr. Douglas, the director of the department, has invented a transparent medium for the growth of *B. diphtheriae* on which the colonies of this organism have a distinctive appearance, whereas other bacteria are inhibited. In conjunction with Mr. Barnard he has carried out some experiments which show that overdoses of light rays from a mercury-vapour lamp tend to allow the tissues of resistant animals to be invaded by bacteria. Other experimental work by Dr. Douglas appears to make it certain that a temperature of 65° C. for thirty minutes will kill the tubercle bacilli in naturally infected cow's milk.

Dr. Gye and Dr. Purdy have been studying the poisonous properties of colloidal silica, and Dr. E. H. Kettle of St. Mary's Hospital has been working with Dr. Gye on the effects of silica dust upon the tissues, with special regard to the problems of industrial tuberculosis. These researches have shown that the lesions caused by the silica provide a nidus in which the tubercle bacilli, protected from the bactericidal defences possessed by the normal tissues, can multiply and so initiate progressive damage. Dr. Laidlaw has been studying the factors which favour the growth of pathogenic bacteria, with special reference to the stimulating constituent present in meat extract, which is believed by some to be allied to the vitamins.

Dr. Colebrook, whilst at the Institute, carried out some experimental work for the Committee on the Causes of Dental Disease, being a study of the artificial erosion of teeth, of the types of acidophile bacilli occurring in the mouth, and the micro-organisms actually found in carious teeth. Dr. Tytler completed some investigations of the conditions favourable to the growth of some haemolytic strains of streptococcus obtained from scarlet fever cases, and studied the stimulating effect of blood serum in increasing the rate of growth and final bacterial concentration, and found that solutions of either fresh or crystallized haemoglobin had an effect on growth more powerful than that of serum. Mr. Dobell, in the Department of Protistology, has been preparing for publication an extensive study of the coccidia, and has also been working at the theory and practice of staining spirochaetes and other micro-organisms with silver salts.

In the Department of *Applied Physiology* Dr. Hill and Dr. Campbell have been working at various problems of body heat and metabolism. They noted when observing the rates of internal chemical exchanges in children crippled by surgical tuberculosis and lying fixed in splints in bed at the Lord Mayor Treloar Hospital, Alton, that the beneficial exposure of the children, more or less nude, to the open air in summer increased these exchanges in metabolism on an average to about 40 per cent. above the standard basal figures for closed chambers. Working at Montana, Switzerland, Dr. Hill studied the results of exposure to the alpine open air under a variety of conditions.

At the Institute, Hampstead, a wind tunnel and revolving platform have been constructed by means of which Dr. Hill and Dr. Campbell have been able to determine the amount of cooling necessary for comfort during various degrees of muscular work; the frequency of the heart beat was much less when the body was adequately cooled. Dr. Campbell and Mr. Webster studied the metabolic changes taking place in individuals working at night and sleeping during the day and compared these with the normal routine. Air injected into the pleural cavity (as in the treatment of consumption by the production of artificial pneumothorax) was found by Dr. Hill and Dr. Campbell to alter in its composition, and the partial pressures of the gases in this air appeared to approximate finally to those in the tissues and venous blood and not to those in the alveolar air of the lungs. In the Department of *Applied Optics* Mr. J. E. Barnard has carried out some valuable work on microscope technique and has commenced an investigation of the structure of bacteria.

In the Department of *Statistics* Dr. Brownlee has been engaged in preparing an account of the data necessary for the statistical study of immunity and in investigating the relation of scarlet fever to rainfall. Dr. Young has worked upon the data of the statistics of epidemic infantile diarrhoea and extended the investigation to several towns in the provinces and abroad. Mr. Russell has been studying the relationship between weather and disease, and the Registrar-General's statistics of the incidence of cancer in different trades have recently been placed at the disposal of the Council and have been extracted by the clerical staff of the Statistical Department.

Many additions have been made to the Library during the year and the Council again draws attention to the fact that approved persons interested in medical research are allowed free use of the library by arrangement with the librarian. Eight numbers of the Special Report Series (Nos. 60–67) have been published during the year and three others are in the press, while two (Nos. 19 and 38) are being completely revised, brought up to date, and reissued.

EXPERIMENTAL MEDICINE AND THE RESEARCH WORK OF CLINICAL UNITS.

At *University College Hospital*, London, Sir Thomas Lewis and his co-workers have been studying the effects of certain drugs on auricular fibrillation, particularly with a view to ascertaining if the actions of these drugs can be explained on the basis of the theory that fibrillation is due to a "circus" movement in the auricle. In searching for a drug which would produce a notable prolongation of the refractory period of the auricular muscle, atropine was first examined, but it was found that the customary clinical doses are insufficient to produce a maximal heart reaction, but that when adequate

larger doses are given a very definite effect is produced on the fibrillating auricle. When the discovery of von Frey became known in this country attention was turned at once to the study of the alkaloid quinidine, and von Frey's statements were confirmed. Like atropine, it was found that quinidine lengthens the refractory period, and it has this action in conspicuous degree; given in therapeutic doses its action in this respect far surpasses that known in the case of any other drug. Another notable effect of quinidine was discovered to be its paralytic effect on the vagus nerves due to an action on the ganglia of the vagus, and not upon the vagal endings. Clinical observations have been undertaken to ascertain the most suitable methods of administering quinidine, its proper dose and rate of absorption, and allied questions.

In the medical unit of the hospital Dr. J. W. McNee has continued his work on diseases of the liver and on the metabolism of cholesterin.

At the *London Hospital* Dr. A. W. M. Ellis has completed some investigations on the subject of "bacteriophage" phenomena and Dr. J. R. Marrack has continued research work on nephritis.

At *St. Thomas's Hospital* the chief research undertaken during the last year was an investigation into the value of renal tests in genito-urinary surgery, and it has been shown that many of the dangers associated with this branch of surgery may be avoided or overcome by a judicious investigation beforehand of the renal efficiency.

At the *Royal Infirmary, Edinburgh*, Dr. Davies has studied the respiratory function in disease and has made a series of determinations of the basal metabolism in various pathological states. Mr. Harrington has investigated the occurrence and distribution of histamine in the human bowel.

Research work in professional practice has been encouraged and assisted in many places, notably at Norwich, Hull, Glasgow, Newcastle, and in London. Grants have also been made to the *St. Andrews Institute of Clinical Research*, where, under the direction of Sir James Mackenzie, important schemes of research into the early stages of disease are being pursued.

Determination of Biological Standards and the Methods of Biological Assay and Measurement.

A standard test for *arsenobenzol compounds* has been evolved by estimating the curative effect of these compounds on mice infected with *Trypanosoma equiperdum*, and manufacturers have been enabled to modify their processes so as to produce neo-salvarsans which satisfy the tests now imposed.

The *standardization of pituitary extract* has been made possible by the work of Dr. Dale and Dr. Burn, who have indicated a method of producing a trustworthy standard of reference and described details of a method of comparison which, if faithfully observed, would suffice to eliminate any significant fluctuations in the activity of this extremely valuable but dangerously powerful remedy.

Dr. P. Hartley is continuing the work on the *standardization of antidiphtheria serum*, which was commenced by Dr. Colebrook.

The *National Collection of Type Cultures* has received during the year many valuable additions to the collection. Over 300 fresh types were received into the collection and over 2,500 cultures were distributed.

The *production of standard cultures and serums* for use in diagnosis of enteric and dysenteric infections has been continued at the Standards Laboratory at Oxford, and during the course of twelve months 297 orders for cultures and 116 orders for serums have been executed.

The Sero-diagnosis of Syphilis.—One thousand samples of blood from syphilitic patients and from controls have been submitted to examination by the sigma reaction of Dreyer and Ward and the orthodox Wassermann reaction, and the results of this trial will shortly be ready for publication. Work is being carried out with the object of producing *standard antidysenteric, antipneumococci,* and *antimeningococci serums.*

Anthropometric Methods and Standards of Medical Measurements.—The main object of this investigation has been the correlation of Professor Dreyer's "vital capacity" test for physical fitness with other measurements, and this work has been continued by Dr. F. G. Hobson at the University of Oxford. Dr. G. H. Hunt and Professor M. S. Pembrey have extended their observations upon the influence of muscular work upon the heart, especially in relation to the factors that influence the pulse ratio.

Research in Specific Subjects.

Problems of Child Life.

Under the heading of *Pre-natal Studies* the factors contributing to dead births and premature births have been examined by a large number of workers, and the combined results have been placed in the hands of a special sub-committee consisting of Dr. J. W. Ballantyne, Dr. J. S. Fairbairn, and Mr. Eardley Holland, from whom a report is shortly expected for publication by the Council. The toxaemias of pregnancy have been investigated by Dr. O. L. V. de Wesselow, who has shown that examination of the kidney functions appears to give information as to the course of the disease, which is of value to the clinician in determining whether induction of labour is necessary or desirable. Metabolism and general physiology in pregnancy and the lying-in period have been studied by a group of workers at the Royal Free Hospital and School of Medicine for Women. An inquiry into the influence of maternal nutrition upon the infant has been commenced at St. Thomas's Hospital under the direction of Dr. J. S. Fairbairn.

Under the heading of *Post-natal Studies* there is described an investigation carried out under the auspices of the Scottish Child Life Committee into the influence of various factors on nutrition and growth, both by the collection of records from child welfare centres and by the home visitations of special workers in the service of the Council. Many of the records received were unsatisfactory, but after a thorough weeding out of imperfect documents over 3,000 schedules, having over 5,000 height and weight records, have already been completed with sufficient accuracy. An analysis of these figures shows that no correlation is manifest between the nutrition of the child under 1 year and the size of the family, position of the child in the family, or number of persons per room. The suggestion is that irrespective of these conditions, even if unfavourable, the infant may still start life unhandicapped. "On the other hand," to quote the words of the report, "there appears to be an indication of a direct correlation between the condition of the child and the health of the mother during pregnancy. As regards the influence of feeding the information obtainable is not sufficient to allow a valid estimate to be made of the effect of this important factor because the data are not quantitative. All that could be done was to attempt to determine whether any differences in growth and nutrition could be found as between infants breast-fed for three months and over and those not breast-fed at all, or breast-fed only for a shorter period than three months. No correlation, however, could be established here."

The special visitors in the service of the Council obtained records of over 500 families visited in Glasgow and 220 in Dundee, and with the co operation of Dr. Weir and other members of the anatomical staff of the University of Glasgow obtained records of about 4,000 school children. In order to express numerically the state of growth and nutrition it was decided to take height in inches as the measure of growth and height for age as the measure of nutrition. The results of this extensive inquiry may be briefly summarized as follows. Over 91 per cent. of the children were of the brown-haired or completely mixed type, and no notable difference in stature subsisted between the fair-haired and dark-haired groups. It has been established that the size of the offspring is related to the size of the parents, and the high proportion of stunted adults in Dundee gave an opportunity of investigating this. There seemed to be a direct correlation between the size of the family, the family income, and the air space per person, and the nutrition of the child.

Work on the metabolism of infants has been carried out by Dr. G. B. Fleming and Dr. J. A. Gardner.

Rickets.

Further experiments have been carried out by Professor Noël Paton and his associates to test the possibility that rickets may be an infectious disease, and to elucidate the modes in which dietetic modifications may cause or prevent the disorder. At the Royal Hospital for Sick Children, Glasgow, Dr. Galbraith has studied the results of different therapeutic measures in 47 cases of rickets, and an account of this work will be published in due course. Professor Mellanby, who, thanks to the co-operation of the University of Sheffield, now possesses exceptional facilities for studying this disease, has been more particularly concerned with the relationship of the antirachitic food factor to calcium and

phosphorus in the diet, with the relative rickets-producing effects of different cereals, and with the influence upon rickets of thyroid gland administered by the mouth.

Accessory Food Factors (Vitamins).

Dr. J. C. Drummond and Dr. S. S. Zilva have carried out further work on the nature of the substances giving its valuable therapeutic qualities to cod-liver oil, and endeavoured to trace the origin of the so-called vitamin A, which is held to be the active substance responsible for the beneficial effects obtained in the use of the oil. It has been shown that simple marine diatoms growing in an artificial inorganic medium can produce relatively large amounts of the vitamin. But the diatoms do not form the direct food supply of the species from which the liver oils are usually derived, and there are several stages through which the vitamin appears to be transferred. The minute animal organisms near the surface of the sea feed directly on the microscopic plants, and these in turn constitute the food supply of numerous small kinds of fish or the young of larger kinds. The fish from which the medicinal oils are derived feed chiefly on the smaller fish and store up the vitamin transferred in this manner. Dr. Zilva and Dr. Drummond have shown that there is very little loss of vitamin during the steaming processes, which are now generally employed by manufacturers, but there are wide variations in the vitamin values of different samples of cod or other fish liver oils, which may be due to the variations in the food supply of the fish, or to the seasonal variation in their physiological condition. The vitamin values for cow's milk and butter are known to be higher during grass feeding in summer than during winter feeding on roots, hay, and "concentrates"; by giving the cows cod-liver oil as a supplement to a diet of hay, roots, and cake mixture evidence of increased nutritive value of the butter was obtained.

Professor Korenchevsky, working at the Lister Institute, has made it clear from his extensive chemical and histological observations that vitamin A, or some other factor as yet not differentiated from it and of similar distribution in animal fats, exerts a controlling influence in the deposition of calcium in the skeleton. A deficiency of calcium and phosphates in the diet appears to play a contributory part. Dr. Goldblatt's experiments show a close correspondence between the amount of vitamin A in the diet and the calcium content of the skeleton.

An investigation of the values of different dietaries during the school age of life has been begun by Dr. H. Corry Mann. At a model village outside London where about 600 boys of the industrial class are housed in separate homes, each containing some thirty boys, three houses have been assigned for the work, and these are occupied by batches of boys between 7 and 12 years, and whose weights lie between 45 and 70 lb. Repeated clinical examinations are made, and notes are taken of general development at regular intervals. During a preliminary period of four months the progress of all the boys was watched while they were consuming the basic diet of the village. By means of food analyses an estimate has been obtained both of quality and calorie value of the individual rations eaten. After the four months on the basic diet a change was made, and two of the homes have since received additional items of food, the third home remaining on the basic diet as a control group of thirty boys. In one of the homes the additional item is fresh milk, and it is proposed to continue the investigation for at least two years, the progress of the boys being noted.

The work on deficiency diseases in Vienna has been continued during the past year with the joint support of the Medical Research Council and the Lister Institute by a staff of workers under the direction of Dr. Harriette Chick, the main object being to observe the part played by diet in the prophylaxis of rickets in young infants. The observations have been made upon nearly 100 young infants, who were placed in two groups upon two contrasted diets but under identical conditions of general management and hygiene. Diet I was high in calories, high in carbohydrates, low in fat, and low in vitamin A. Diet II was lower in total calories, lower in carbohydrate, richer in fat, and, as it contained a daily ration of cod-liver oil, much richer in vitamin A. The results of this observation on prophylaxis showed—

"1. That slight but definite rickets was developed with great regularity during winter upon Diet I, but not upon Diet II.

"2. That it was not developed in summer upon either diet.

"3. That the age of greatest susceptibility to the onset of rickets is during the first half-year of life."

A comparison was made of the effects of treatment of rickets with cod-liver oil, radiation from the mercury-vapour quartz lamp, and sunshine out of doors. The results as observed by systematic *x*-ray photography showed that deposition of calcium occurred consistently in the epiphyses of children under any of these three forms of treatment, while negative results were obtained in the control children. These results lead to the conclusion that quality of diet, especially absence of antirachitic element, is probably the most important factor in the causation of rickets in winter, and that sunshine may be the chief preventive factor in summer.

Human Nutrition.

Studies in human nutrition have been carried on in the physiology department of King's College for Women, under the direction of Professor V. H. Mottram. Miss Hartwell has shown that a diet rich in protein given to a nursing rat injures the health of the litter. These high protein diets are unsuitable only during lactation, and appear to be beneficial for growth, fertilization, or reproduction. The addition of milk in large quantities to the diet protects the offspring from the special danger from high protein diet during lactation. By a process of elimination this protective substance was traced to vitamin B. Miss Clifford's studies on the preservation of meat by various methods of cold storage have been chiefly concerned with the distribution of carnosine in the animal kingdom.

Causes of Dental Caries.

The Committee on the Causes of Dental Disease, under the chairmanship of Professor W. H. Halliburton, has initiated several investigations which are being carried out in different parts of the country.

Disorders of the Cardio-vascular System.

In addition to the work of Sir Thomas Lewis and his colleagues already referred to, many other researches have been assisted by grants from the Council, as, for example, the investigations on disordered action of the heart which Dr. H. J. Starling has been conducting at Norwich.

Exophthalmic Goitre.

At Sheffield Professor Mellanby has been making a closer study of the dietetic factors causing abnormal developments in the thyroid gland, and grants have also been made to Dr. G. S. Williamson at the Royal Free Hospital, London, and Dr. G. K. Stone at St. Bartholomew's.

Disorders of the Respiratory System.

Special attention has been paid to the clinical uses of oxygen by workers at Guy's Hospital, and Professor J. C. Meakins has continued his tests of the utility of the more portable forms of apparatus devised for the administration of oxygen in disease. Medical problems of high flying have been studied by Major H. F. Pierce, working at the University of Oxford.

Disorders of the Excretory System.

Work on experimental nephritis carried out by Professor J. Shaw Dunn at Manchester and Dr. A. S. Strachan at Glasgow has been assisted by grants from the Council.

Disorders of the Nervous System.

General neurological studies have been undertaken by Professor T. Graham Brown, Dr. Ivy McKenzie, and Dr. J. P. Hettwer, and the special Committee on Nerve Injuries has been preparing data for a report on injuries of the spinal cord. A group of workers at the University and Western Infirmary, Glasgow, have continued their researches on that common and distressing form of progressive paralysis, disseminated sclerosis, and the pathological changes which take place in neuro-syphilis. Dr. C. Da Fano has continued investigations into the pathology of lethargic encephalitis and the significance of the minute intracellular structures described by him in the brain tissues. It has been shown by Dr. J. R. Perdrau that the vesicular fluid from certain forms of skin affection (for example, herpes) contains a virus capable of producing a disease in animals which is transmissible from one animal to another and produces fatal lesions, in many ways similar to those of encephalitis lethargica. Minute bodies have been found in the vesicular fluid of herpes and in the brain tissue of infected animals, and it is possible that the smallest of these structures may represent the virus itself.

Mental Disorders.

At the University of Cambridge Miss L. G. Fildes has continued to receive a grant for whole-time research work in the causes of mental defect in children with the object of discovering what specific psychological characters exist which mark off a mentally defective from a mentally normal individual. Grants have been made to numerous other workers who are studying problems connected with mental disorders.

Tuberculosis.

From a study of another series of cases, 132 in number, of bone and joint tuberculosis, Dr. A. Stanley Griffiths has been able to show that the infection has been of bovine origin in rather more than 20 per cent. of the cases under 16 years of age, and 6.5 per cent. of the cases over 16. Dr. Inman has been working on the morphology and agglutinability of the tubercle bacillus, and Dr. Coulthard has completed an investigation into the complement fixation reaction in tuberculous cases.

The opsonic index in tuberculosis has been made the subject of a special study by Miss C. M. Acland, working with Colonel S. L. Cummins at Cardiff; and the work which Dr. Charles Miller and Dr. H. M. Turnbull have been carrying out at the London Hospital on the primary sites of infection in cases of children under 10 years of age is being continued. Dr. L. S. T. Burrell and Dr. A. S. MacNalty have prepared a report on the value of artificial pneumothorax as a method of treatment in pulmonary tuberculosis, with a discussion of the attendant dangers and difficulties, and of the groups of patients for which the method is suitable. Professor G. Dreyer and Dr. H. K. Ward are continuing their researches on the standardization of tuberculin. The importance of this work is made manifest by the report of the Tuberculin Subcommittee, which came to the conclusion "that until an accurate method of standardizing tuberculin is obtained, the administration of tuberculin can only be carried out empirically as a therapeutic measure, and the results in human tuberculosis cannot be evaluated or scientifically controlled." The greater part of the Tuberculin Subcommittee's work has been given to an investigation into the efficacy of the various tuberculin tests in cattle, and a full report on these inquiries will be presented at an early date. Grants have been made by the Council to research workers in different parts of the country who have been studying chemotherapy in tuberculosis, and records of the after-histories of sanatorium patients have been collected from special sanatoriums.

Influenza.

The Council has published the work of Professor James McIntosh on the etiology of influenza[1]; it has furnished a grant to Dr. P. Fildes for his work on the conditions of growth of *B. influenzae*; and Dr. Gordon's work on the presence of a filter-passing organism in the early stages of influenza[2] has been undertaken on behalf of the Council.

Studies of the Streptococcus and Pneumococcus Group.

Dr. Gordon has continued his study of the characters and clinical significance of pathogenic streptococci, chiefly by serological methods, chief attention having been given during the past year to non-haemolytic strains. In contrast to the striking uniformity which had been found to exist amongst the haemolytic streptococci when studied by serological methods, it has now been found that seventeen specimens of non-haemolytic *S. salivarius* recovered from endocarditis during the past year are separable into at least fourteen distinct serological types, and of three specimens of *S. faecalis* from similar cases all were found to be distinct serologically from one another. Dr. G. K. Stone has shown that while the complement fixation test is far more delicate than the agglutination test for identifying streptococcal infections, and has certain other advantages over it, it is less specific in the sense that infections by the three types—*S. pyogenes*, *S. salivarius*, and *S. faecalis*—are not differentiated so sharply or completely by complement fixation as by agglutination. Dr. R. R. Armstrong has been studying the serological types of pneumococci and the relative prevalence of the various types of infections in acute pneumococcal diseases in this country. Dr. J. F. Gaskell has been studying the modes in which the lungs offer resistance to infection, and concludes that the character of the lesion produced under different conditions of infection does not depend on the type of the infecting organism but upon its virulence.

[1] See BRITISH MEDICAL JOURNAL, July 22nd, 1922, p. 137, and August 19th, p. 303.

[2] See BRITISH MEDICAL JOURNAL, August 19th, 1922, p. 293.

Arthritis.

Dr. T. S. P. Strangeways and Major Horne, I.M.S., have received assistance in their work on rheumatoid arthritis. Mr. A. G. T. Fisher's work has shown that the earlier changes in the joints are primarily inflammatory rather than degenerative, and evidence has been added to that already pointing to the important effects of toxic substances derived from chronic infective foci in the alimentary tract and elsewhere.

Malignant Disease.

Grants have been made to Dr. James Young, for his work on the causation of cancer, and to Mr. A. N. Currie, who has been working at the significance of fat and lipochromes in the etiology of cancer.

Radiology and Radiotherapy.

The radium bromide held by the Council for research purposes has been allocated to different institutions, at each of which special investigations have been commenced in the treatment of disease by radiation.

The Biological Actions of Light.

Plans have been made for investigation of the specific effects of light and of its different constituent rays on the body fluids and tissues and their simpler components, and on bacteria and protozoa both within the body and outside it. Many of these investigations have already commenced at different centres.

General Biochemical Researches.

Under this head are included researches in bacterial chemistry, the oxidation in the tissues, responses to meals, metabolism in diabetes, efficiency of hepatic function, distribution of glycogen and other carbohydrates in the body, properties of haemoglobin, action of diuretics, and the uses of pituitary extract in childbirth. Researches in all these subjects, carried out by different investigators, have been assisted by grants from the Council.

General Physiological and Pathological Researches.

An account is given in the report of a large number of investigations in general physiological and pathological problems the expenses of which have been defrayed either in part or *in toto* by the funds of the Council.

Experimental Epidemiology.

The experiments which Dr. W. W. C. Topley and his coworkers have carried out on the problem of the spread of epidemics amongst mice have been assisted financially. His important observations on the course of events during the pre-epidemic phase of the spread of infection and on the effects of dispersal of the population have already been published.

Metazoan Parasitology.

The report mentions researches on "the structure and infections of lice and ticks" and "worm infections," towards which the Council has supplied grants.

INDUSTRIAL MEDICINE AND INDUSTRIAL FATIGUE.

The Council has provided expenses for researches on dust inhalation and pulmonary disease, miners' nystagmus, miners' "beat knee," "beat hand," and "beat elbow," ankylostomiasis in Cornish miners, and the incidence of occupational diseases. The unprecedented trade depression throughout the year greatly affected the work of the Industrial Fatigue Research Board, and has prevented the full development of the schemes foreshadowed in a previous annual report. On the other hand, advantage has been taken of this abnormal period to gain knowledge of the effects of short time and of the changes in the usual incentives in industrial work. Mention is made in the report of various investigations completed during the year or now in progress.

CONCLUSION.

In concluding this report the Council refers with gratitude to the generous gift of the Board of the Rockefeller Foundation of New York of 2,000,000 dollars to the Government for the purchase of a site and the erection of a building for a great school of hygiene in association with the University of London. Reference is made also to the important endowments to medicine and its allied sciences which have come recently from within our own country, and in particular to the gift of £100,000 made by the trustees of Sir William Dunn's residuary estate to the University of Oxford for the

building and maintenance of a new school of pathology; the trustees have also undertaken to provide funds for converting the present pathological buildings into an adequate school of pharmacology. Finally, mention is made of the important financial help recently given by the same trustees to the clinical units in St. Bartholomew's Hospital, St. Thomas's Hospital, and the London Hospital, for the construction and equipment of either new or improved laboratories.

Other important benefactions to medical science made in the past year to which the report refers include the sum of over £80,000 under the will of the late Miss Foulerton for the endowment of research work, at the discretion of the Royal Society, the gift of £20,000 by Lord Atholstan to the Imperial Cancer Research Fund, and £10,000 by Sir William Veno to the Cancer Research Department of the Middlesex Hospital. One gift which the Council considers to have special significance is that of the Panel Committee of Sheffield, which has contributed £1,000 to the University of Sheffield towards the provision and equipment of the Field Laboratories which have been erected by the university close to the city.

Nova et Vetera.

MEDICINE IN CHINA.

THE Chinese trace the beginnings of their art of healing to the legendary Yellow Emperor, who is said to have ruled about the middle of the third millennium before Christ.

Legendary Origins.

The Yellow Emperor was aided in his administration by a group of supermen, whose names are still current in popular tradition as pioneers of most of the sciences, arts, and crafts since practised by the race. One of his beneficent acts was to take counsel how to prolong the span of human life, since he was grieved at the many bodily ills afflicting his subjects. It is narrated that with the help of several of his physicians he succeeded in studying problems of public health to such good effect that the longevity of the people was substantially increased. At the present day there exist several medical treatises attributed to the Yellow Emperor. This association with his name can hardly be regarded as implying more than extreme antiquity for the notions recorded, yet there seems reason for believing that the oldest of the books was actually compiled several centuries before our era, and that it then provided a summary of medical knowledge handed down from the remotest past.

Several centuries earlier than the famous Alexandrian school of anatomy under the Ptolemys, a Chinese physician, named Pien Ch'iao, is reputed to have performed human dissections, and understood the function of blood vessels. His name is still connected with the elaborate pseudo-science of the pulse professed by Chinese leeches, and it may safely be concluded that his acquaintance with the structure of the body was very slight. Hua T'o, another doctor living some eight centuries later, has been called by Western writers the Asklepios of his race. This title, however, would be more appropriate to the physician hero-god Ch'i Po, who was the chief adviser of the Yellow Emperor in his hygienic reforms, while Hua T'o might suitably be termed the Chinese Hippokrates. Hua T'o is said to have used an anaesthetic agent for his surgical operations. The drugs employed cannot be identified with certainty; probably they were compounded of aconite, henbane, and datura. Hua T'o is renowned as the first to operate successfully on cataract. He ended his days A.D. 220 in prison, where he had been cast by the most powerful man in the empire, who had consulted him for violent headaches, and was advised to have his skull opened under an anaesthetic. The patient suspected in this the treacherous design of some enemy, and indignantly refused. He died the same year as the doctor from what appears to have been a cerebral tumour.

Taoism and Alchemy.

The foregoing scraps of legend and history are sufficient to suggest that the ancient Chinese were not far behind their Mediterranean contemporaries in medical knowledge. Questions about possible borrowing by the East from the West in those remote times await fuller investigation. On the other hand, our present knowledge makes it permissible to formulate a plausible enough theory showing China the mother of at least one of our own sciences. The names mentioned above are those of reputed exponents of a cult embracing many activities besides the arts of healing and physical development. The cult of Tao appears early in the records of authentic history as concerned with a search for the Elixir of Life and the Philosopher's Stone. There are accounts of certain feudal princes dispatching expeditions under the leadership of its sectaries to bring back the magic agencies they believed were to be found in some mid-ocean paradise—the Insulae Fortunatae of the Far East. In the fourth century B.C. the first band of venturers sailed from the coast of China, and it was followed by others. Emperors, in feverish pursuit of immortality, lavished riches and honours on Taoist charlatans. One in 133 B.C. gave his imperial sanction to alchemy, and we may infer from the passage recording the event that the art was then no new one. Taoist alchemists increased exceedingly, and for many centuries numbers of recluses carried out mysterious researches with the crucible in their mountain hermitages, or roamed the countryside plucking herbs from which to brew death-defying potions. A most voluminous literature is devoted to stories of those happy ones who thereby escaped the fate of ordinary mortals. Nevertheless, the truth-loving compilers of dynastic annals are fain to chronicle the demise of many as the result of drinking Elixirs of Life, and among the number are several emperors. Yet there is reason to believe that not a few Taoists trod a middle path between these two extremes, and thus acquired much knowledge of plants and minerals which was turned to useful purpose by the race.

Very similar on our side of the world is the tale of the pursuit of immortality and transmutation of metals. Striking resemblances are to be found between the writings of Western and Chinese alchemists—resemblances that extend even to the actual jargon that cloaks their mysteries. But the two schools are separated by differences of time, and to the Chinese the priority is undoubtedly due. The theory hinted at earlier in this article is that much of Western alchemy, the forerunner of chemistry, was derived from China, chiefly through Mohammedan intermediaries. Evidence of communication between the Chinese, Persians, Arabs, and even Greeks in Constantinople is ample enough to prove that opportunities were not lacking for the passage of the mysteries westward.

Western Medicine in China.

But whatever indebtedness there may have been on our side, the balance is surely now being adjusted. Western medical science has been carried to China both by men of our own race and by Chinese trained in our schools. Dr. Peter Parker opened an ophthalmic hospital in Canton in 1835, and not long afterwards a native, holding Scottish qualifications, started to practise among his countrymen in the south. Since then practitioners and teachers of many nationalities in increasing numbers have offered the benefits of Western learning to the Chinese. One of the most eminent medical men in the Far East is Dr. Wu Lien-teh, known to many in this country under the name of G. L. Tuck. After a distinguished academic career at Cambridge, Paris, and London, Dr. Wu returned to his native land and became a pioneer of public health administration. The immensity of the task confronting him can hardly be appreciated by those unfamiliar with the vastness of China and the complacency with which the greater part of its millions accept conditions little advanced during the sixteen centuries since the physician Hua T'o died in his dungeon.

Plague Prevention To-day.

The deadly outbreak of plague in Manchuria, 1910–11, profoundly stirred the apprehensions of Chinese and foreigners alike, and paved the way for the establishment of the North Manchurian Plague Prevention Service with headquarters in Harbin. Dr. Wu practically created this efficient organization, and a recent report, now before us, commemorates the tenth year of its existence under his able directorship.[1] This stout and well printed volume of 354 pages is far from being a mere matter-of-fact record of the doings during the last four years of the Plague Prevention Service formally instituted in October, 1912. It contains many articles on divers subjects of vital interest respecting the progress of Western medicine in China. For instance, there is an important memorandum outlining a suggested scheme of medical education, and there is a survey of the advances made since the establishment of the Republic in 1911. It may be noted,

[1] *North Manchurian Plague Prevention Service Reports, 1918–1922.* Edited by Wu Lien-teh, M.A., M.D.Cantab. Tientsin. 1922. (Pp. 354; 37 illustrations, 1 map, and 2 charts).

by the way, that this mentions the epoch-making event of a presidential mandate authorizing human dissection. Some of these articles have appeared before in various journals, but a great part of the clinical matter is published here for the first time. The second pneumonic plague epidemic in Manchuria, 1920–21, is admirably recorded, and of great interest, too, is an account of the cholera epidemic of 1919. A vast deal of laboratory research, including experiments on tarabagans, occupies an important section of the book. Further, the report is enlivened by numerous excellent illustrations not concerned solely with the manifestations of disease. All the contents are contributed by members of the Prevention Service staff, and we note that a large share comes from the pen of the editor himself.

Perusal of this book impresses one with the fact that the Plague Prevention Service has far more than justified its existence. The work it has achieved at the comparatively small annual cost of 60,000 taels (90,000 dols.) offers an object lesson of economical administration which might well be studied in some Western countries. It was Dr. Wu's earnest hope to expand this small but efficient service into a national Department of Public Health. The times have been against him, but if he achieve his ambition assuredly he will be regarded as no less a benefactor to his race than some of the illustrious personages we have named.

W. P. Y.

WINTERING ABROAD.

ITALY.

The Ligurian Riviera.

The frontier between France and Italy on the Mediterranean coast is a diplomatic line not marked by any prominent natural feature. What was said in general terms about the French Riviera in the article published in our issue of October 28th, 1922 (p. 815), applies likewise, in the same general way, to the adjacent places in Italy, though here also the particular character of the climate may be influenced by local topographical conditions. About thirty miles farther on, however, the coast takes a north-easterly trend, so that the places on this part of it, speaking generally, look south-east; behind all of them are hills near or not far back. These two facts may serve to account for the claim that the mistral is little felt, or altogether unknown, in this part of the Riviera, for the mistral is a north-westerly wind. The whole coast from the French frontier to Spezia is spoken of as the Ligurian Riviera, but it is divided into two at the head of the Gulf of Genoa, where the coast trends south-west, so that its general aspect is south-westerly. The part between the frontier and Genoa is known as the Western Italian Riviera (Riviera di Ponente), and the rest, to Spezia, as the Eastern Italian Riviera (Riviera di Levante). These two stretches of coast, therefore, look at each other across the Gulf of Genoa.

Riviera di Ponente.

It is claimed for the Riviera di Ponente that it has a dry and stimulating air, with abundant sunshine, and few wet days. The rainfall, though it does not differ greatly in quantity from that at the southern English winter resorts, occurs on many fewer days—five instead of fifteen. It is, of course, heavy while it lasts, but fogs and mists are infrequent. The disagreeable wind is from the east, but it is often possible to find a resort sheltered from that quarter. It is said that the drop in temperature at sunset is less than on the French Riviera. Great stress is laid on the dryness of the atmosphere, which is favourable to many conditions, including chronic bronchitis, but is often found not to suit persons of nervous temperament, who may find it too stimulating.

The places most frequented by visitors from this country are, taking them in order from west to east, Bordighera, San Remo, and Alassio. The first-named is a very pleasant place of residence; the old town clusters round a hill, the new runs westward, and consists mainly of a single thoroughfare parallel with, and close to, the shore. The place is well protected on the north and east, and its gardens are far-famed. It has many hotels, two casinos, an English club, a tennis club, and the hilly back country affords many beautiful walks and excursions. San Remo is the oldest and perhaps still the best known of the resorts on the Riviera di Ponente. Before 1915 it seemed to be the favourite resort of German visitors, but in recent years it has not been so much frequented by them. The old town stands between two bays—the east and west—and along them the new town extends. The eastern bay is the more sheltered, but both enjoy an equally large measure of sunshine. San Remo also has many hotels, an English club, and an English nursing institute. Its chief industry is the export of flowers, especially carnations, which are largely cultivated on the terraced slopes; a few miles away, at Taggia, there are violet farms. At Alassio the old town stretches along the shore, and visitors stay in villas or hotels on the slopes behind. It is considered to be one of the warmest resorts on this coast, and is a good centre for excursions along the seashore or into the hills at the back.

There are many other smaller resorts on the Riviera di Ponente. Ospedaletto, which lies between San Remo and Bordighera, advances the claim that it is the most sheltered spot on this Riviera and has the most equable climate. It is protected on the east, north, and west by hills. The hotels and villas are for the most part set a little back from the fishing village itself, on wooded slopes with many pine trees. The cultivation of flowers is the chief local industry. There are several good hotels and a casino. Diano Marina, between San Remo and Alassio, and Varazze, a good deal farther along the coast, are smaller places, but are well situated and have adequate accommodation. Lastly comes Pegli, a small town set under hills covered with olive trees, and woods of chestnuts and pine. It is a picturesque place, now almost a residential suburb of Genoa.

Riviera di Levante.

Passing to the Riviera di Levante the first resort is Nervi, about seven miles from Genoa. Here the mountains come down close to the sea, and the place is consequently very sheltered; it is therefore suited to those classes of invalids for whom a very mild winter climate is desired. It has several hotels, and is frequented chiefly by the sick rather than by the pleasure seeker. The gem of this part of the coast is the Portofino Peninsula. From the crest of the peninsula it is possible on a clear day to see across the bay, even to the headlands of the French coast, seaward to Corsica, southwards all along the coast to Spezia. To reach Portofino the visitor must leave the train at Santa Margherita, which is itself a good centre for walking excursions. Though it has the sun on it for a longer time it is not so well sheltered from the east as Rapallo, which is perhaps the best known resort on the Riviera di Levante. It has a casino and many hotels. Visitors are attracted especially by the picturesque coastline; to the east it rises in precipitous rocky cliffs; westward the coast is lower and is traversed by the road through Santa Margherita to Portofino. There are a number of small places beyond this before the naval port of Spezia is reached.

Journey: Cost.

The longer journey, with its increased cost, deters many British visitors from penetrating to the eastern part of the Ligurian Riviera. The cost of living in Italy, which was very low before the war, has increased very considerably since 1914; the increase is in fact even greater than in this country, but this is to some extent compensated by the present rate of exchange. Not a bad plan is to go first to one of the larger resorts and spend a week or ten days in looking about the neighbouring places. *En pension* terms for rooms, breakfast, lunch, and dinner, can usually be obtained at hotels for visits of not less than five days; but the actual rates of course vary according to the class of hotel selected. Visitors who know their way about will be able to find good accommodation at very moderate rates, when the exchange is considered, in the smaller hotels, and the cooking may nearly always be depended upon. *En pension* terms may be put down roughly as ranging from 60 to 40 lire a day. There is a tax on hotel bills varying from 1 to 12 per cent., according to the category of the hotel, but averaging perhaps 6 per cent. An addition of 10 per cent. is made to the account for service, and direct tipping is supposed to be eliminated. There is also a sojourn tax, similar to the "Kurtax" levied at German and Austrian resorts; it may be fixed on the basis of 10 per cent. of the price of the visitor's room, but in some places there is a charge of from 50 to 30 lire for the season.

With regard to the best routes to take to the selected resort information can be obtained from the Tourist Office of the Italian State Railways, 12, Waterloo Place, Regent Street, London, S.W.1, where advice will be given about the journey, as to the best way of transmitting funds to Italy, about the selection of hotels or pensions, and as to passports and visas.

THE NAPLES RIVIERA AND SICILY.

A visit to the Naples Riviera involves a long railway journey, but the district, which includes all the resorts on the Bay of Naples, and the islands of Capri, Ischia, Procida, as well as Amalfi and Ravello, affords a considerable variety of climate, owing to the different situation and aspect of the various places. The climate of Naples itself is reputed to be dry, and the town is a good centre for excursions. The rainfall of Capri is low; the temperature is slightly higher than on the Ligurian Riviera, and the drop at sunset not marked. Sorrento, which has a fine casino and terrace looking over towards Naples and Vesuvius, is perched on rocky cliffs which rise to a height of about 300 feet. It faces north, and is therefore in midwinter rather cold for an invalid. Twenty miles away, on the Bay of Salerno, is Amalfi; it is reached from Sorrento by a road the beauty of which is far-famed. It faces due south, and the climate is described as bracing, with many bright clear days. Excursions may be made from it to Ravello, Salerno, and Peastum.

Sicily can be reached from Naples by a night journey, either by boat to Palermo (twelve hours), or by train to Messina, and then across the straits in half an hour. Palermo, the place most frequented, has an equable soothing climate, with a small range of temperature and little rain, except in December. There are good hotels at Palermo and also at Taormina, but full exploration of the island, with its many beauties and antiquities, should only be undertaken by robust persons willing to make the best of the local accommodation.

MADEIRA.

Madeira is a place which had a great reputation as a winter resort in the mid-nineteenth century. Many consumptives went there only to die, and for this and other reasons its popularity waned; but it is now reviving. It can be reached by the boats of the Union Castle Line from Southampton, the average passage being three days and a half. The boats of the Yeoward Line and the Booth Line run regularly from Liverpool, and those of the Elder Dempster Line occasionally. The boats of the Booth and Elder Dempster Lines call at Lisbon and sometimes at Vigo. The island of Madeira lies in the Atlantic three or four hundred miles due west of Morocco. It is 32 miles long and 13 broad, and the interior is mountainous, rising to 6,000 feet. Funchal, the capital, lies on the south side of the island in a sheltered position, and is the place chiefly frequented by foreign visitors. We are informed by Dr. Geddes-Scott, who resides there, that the mean winter temperature is 62° F., and the diurnal variation averages 4° F.; the mean summer temperature is 77° F. The town slopes up gradually from sea-level to some 700 feet, but there are many villas (quintas) higher up. The average rainfall, the same informant tells us, is some 26 inches, falling mostly in November and December, and he lays stress on the absence of dust even in dry weather. In the spring the vegetation of Madeira is remarkable and the supply of fruit excellent nearly all the year round. There are several good hotels, and an international nursing home a little outside the town, overlooking the sea. Before making the journey a tuberculous patient should make sure of accommodation, as some of the hotels object to receiving visitors suffering from that disorder. With regard to the type of tuberculosis which does best in Madeira Dr. Geddes-Scott states that patients suffering from laryngeal tuberculosis often do remarkably well, as do cases of pulmonary disease with concomitant bronchial irritation, cough, and expectoration, even though haemoptysis and high evening temperature be present. A patient with a hard dry cough and little sputum and not much elevation of temperature will probably do better elsewhere. Sufferers from chronic bronchitis can lead a healthy outdoor life, and asthmatics do well owing to the absence of dust. The water supply is now good, and the rate of exchange is favourable to the holder of English money.

THE *Archivos de medicina, cirurgia y especialidades* of Madrid has offered a prize of 1,000 pesetas for the best unpublished work on natural science or medicine.

THE Guild of SS. Luke, Cosmas, and Damian was established in 1900 to facilitate intercourse in the British Empire between Roman Catholic members of the medical profession and the clergy and others, for the study and discussion of medico-religious questions. The Guild has decided to issue a quarterly organ, *The Catholic Medical Guardian*, the first number of which will be published this month by Messrs. Burns, Oates, and Washbourne, Ltd., at the price of 1s. 4d., post free.

DANISH STUDIES OF THE INFLUENZA BACILLUS OF PFEIFFER.

INFLUENZA is so great a scourge, and its return is so assured, that all investigations tending to throw light upon its causation are worthy of attention. The recent discussion on the microbiology of influenza at the Annual Meeting of the British Medical Association at Glasgow[1] brought out the fact that notwithstanding the researches made during the pandemic of 1918, and smaller recurrences since that date, there is at present a lack of agreement concerning the primary infective agent of influenza. The available evidence in favour of Pfeiffer's bacillus as a prime factor, while convincing as regards the presence of an organism of this group in a large proportion of the cases, and also of its pathogenic significance, was not sufficient to carry conviction that the bacillus in question is the actual micro-organism concerned primarily in influenza. On the other hand, the evidence with regard to the presence at the onset of influenza of an organism smaller even than Pfeiffer's bacillus, and capable of passing through filters that hold up the latter, though promising, was admittedly incomplete; for our knowledge of these filter-passing micro-organisms is in such an early stage that some investigators have still to be convinced of the very existence of such micro-organisms. At the moment, therefore, the precise nature of the primary infective agent of influenza is uncertain, and consequently no secure basis has been established for achieving the specific diagnosis, prevention, and treatment of this disease on lines comparable to those availab'e and already exploited with greater or less success in the case of pestilences such as plague, cholera, and infections of the enteric group.

In these circumstances a warm welcome is to be extended to the careful and systematic researches of Dr. Martin Kristensen,[2] of the State Serum Institute of Copenhagen, on the group of bacteria of which Pfeiffer's bacillus is the most important and best known representative. This monograph well maintains the high standard we have learnt to expect of work from Professor Madsen's well known institute. It is ably and critically written in the English language, and is subdivided into five sections, of which the first contains an excellent historical review of the literature concerning the characters and classification of Pfeiffer's bacillus, its occurrence and its relation to influenza. The remainder of the work is devoted to the author's own observations. Thus, Section 2 deals with the incidence of Pfeiffer's bacillus, as determined during four successive waves of influenza in Denmark, and also with its distribution in cases of whooping-cough, measles, tuberculosis, meningitis, and in healthy persons. Section 3, the largest and most important contribution, embodies the result of an exhaustive study of the characters of Pfeiffer's bacillus, and prepares the way for Section 4, in which that organism, now thoroughly defined, is contrasted with three other haemoglobinophilic bacteria submitted to examination in the same manner. The important subject of technique and the conclusions reached by the author are contained in the final section, and the monograph ends with a list of references and three plates illustrating special points in the morphology and manner of growth of Pfeiffer's bacillus. That the scope of Dr. Kristensen's researches has been comprehensive will be realized when it is stated that they extended over a period of four years (1918–22); that this elaborate study of Pfeiffer's bacillus is based on the detailed examination of no fewer than 800 individual strains of that micro-organism; and that the investigation of the incidence of Pfeiffer's bacillus in the healthy Danish population alone involved the examination of over 2,000 persons. In the last direction the medical services of the Danish army and navy afforded him special facilities, valuable help which Dr. Kristensen gratefully acknowledges.

---

[1] BRITISH MEDICAL JOURNAL, August 19th, 1922, p. 291.

[2] *Investigations into the Occurrence and Classification of the Haemoglobinophilic Bacteria.* By Martin Kristensen, Chief of Department at the State Serum Institute, Copenhagen. Copenhagen: Levin and Munksgaard. 1922. (Sup. roy. 8vo, pp. 272; 3 plates.)

As a result of this extensive survey the differential value of the special morphological and cultural characters at present regarded as diagnostic of Pfeiffer's bacillus is upheld. The lowest amount of haemoglobin required to obtain growth was about the same for all the strains examined, and the dependence of Pfeiffer's bacillus on haemoglobin still persists after prolonged subculture. The hydrogen ion concentration giving optimum growth, the minimum temperature at which growth occurs, and the degree of resistance to desiccation were approximately the same for all the strains examined; so, too, were the inability to ferment glucose and the failure to exert proteolytic action on gelatin or serum. The majority of strains were destroyed by exposure for half an hour to 50° C., though a few resisted a slightly higher temperature. All of the strains were decidedly aerobic. The majority showed the well known symbiotic phenomenon—namely, an increase of growth around colonies of certain other bacteria—a point to which Kristensen devotes considerable attention and which he finds to be on occasion of definite diagnostic value. Serologically the work of previous observers was confirmed; as almost every strain of Pfeiffer's bacillus was found to differ serologically from the rest no progress could be made in defining this organism either with the agglutination and absorption test or with the complement fixation test. The only positive physiological character that was found to offer promise for this purpose was indol production; the majority of strains from cases of influenza gave a good positive result, whereas a considerable proportion of the strains from healthy persons were negative. But as this divergence could not be correlated with any other constant difference, indol production cannot be employed for splitting up the group now included under the name of Pfeiffer's bacillus. It is interesting to observe that Kristensen investigated examples of Pfeiffer's bacillus from cases of meningitis and found that there was no sufficient reason, serological or otherwise, for regarding these cerebro-spinal strains as different from ordinary examples of the Pfeiffer micro-organism recovered from mucous membranes.

Three organisms of the haemoglobinophilic group were differentiated by Kristensen from Pfeiffer's bacillus for reasons which may briefly be specified. In addition to its failure to grow on ordinary agar, or on agar enriched with ascites fluid, an important negative character of Pfeiffer's bacillus is its failure to haemolyse blood. This negative property, which is remarkably constant, at once distinguishes the true Pfeiffer bacillus from a definitely haemolytic organism closely resembling it in other respects, and occurring in a proportion of normal throats, but not in influenza. It is important to note that Bordet's whooping-cough bacillus, of which 75 strains were studied culturally by Kristensen, was found to be distinguished from Pfeiffer's bacillus not only by the well known circumstance that it grows on ascites agar, but also by the very significant fact that so far as Kristensen's somewhat limited serological studies of this whooping-cough organism went, all the strains of it examined were found to conform to a single serological type. A third representative of the Pfeiffer group present in blenorrhoea of the prepuce of dogs was also studied by Kristensen; while indistinguishable from Pfeiffer's bacillus in other respects, it possessed a higher resistance to desiccation, and was further differentiated by the circumstance that colonies of this dog bacillus were found to promote the growth of Pfeiffer's bacillus, a symbiotic property which colonies of the true Pfeiffer organism do not exhibit for strains of their own species.

The observations of Kristensen on the distribution of Pfeiffer's bacillus derive additional weight from the care with which he defined this micro-organism by the studies referred to. In cases of influenza he found the Pfeiffer organism most often in the first couple of days after the onset. In measles the incidence was similar to that found in influenza, while in whooping-cough he actually succeeded in demonstrating Pfeiffer's bacillus more frequently than in influenza. In a group of seven cases of phthisis with no symptoms of influenza he recovered Pfeiffer's bacillus five times, but he was unable later on to detect it in five specimens of material from phthisical cavities. Among healthy persons Pfeiffer's bacillus was found to have a wide distribution; the incidence, however, was very variable, ranging in different groups from 8 to 100 per cent. He found that the incidence of Pfeiffer's bacillus in the general population of Denmark agreed excellently with that of influenza; as a direct consequence of each of the four epidemics a marked increase was observed in the frequency of the Pfeiffer organism in the population as a whole, followed by a sharp decrease. In military camps and barracks Pfeiffer's bacillus was more in evidence than in the general population. In persons who had recovered from influenza Pfeiffer's bacillus was found a little more commonly than in others, but it also had a wide distribution among the general population. Kristensen found that Pfeiffer's bacillus was present in the mouths of 5 out of 60 normal guinea-pigs that had recently arrived from Germany, but he failed to find it either in mice or in horses.

Kristensen does not regard Pfeiffer's bacillus as the primary infective agent of influenza. In the light of the whole of the available evidence his view of the activities of this micro-organism is as follows:

"Pfeiffer's bacillus is mainly adapted to living in the mucous membranes of the respiratory tract in man. In healthy persons it is able to exist for a time, but only with difficulty. Its ideal conditions for development are in mucous membranes already in a catarrhal state, but the nature of the infection producing the catarrh is a matter of indifference: it may be influenza taken in its widest sense, whooping-cough, measles, or tuberculosis. Its growth is also favoured, but to a less extent, by infections which involve a more limited area of mucous membrane—for example, angina, diphtheria, etc., or even catarrh produced by non-bacterial causes. The reason why Pfeiffer's bacillus occurs most constantly in whooping-cough and measles is on account of the wide distribution and endemic character of these diseases preparing the soil. The conditions are otherwise in such a pronounced epidemic disease as influenza. Consider such an epidemic in its very early stages. It spreads over a population the large majority of whom do not harbour Pfeiffer's bacillus. In the early cases Pfeiffer's bacillus is only exceptionally met with, but in those patients in whom it is present it will multiply rapidly and spread to others, and also to healthy persons who may become infected with influenza as well as with Pfeiffer's bacillus, or with Pfeiffer's bacillus without developing influenza, for under the new conditions the bacillus is likely to acquire an improved capacity of developing in normal persons. . . . In this manner the bacillus gradually spreads until it is present in almost every influenza patient and in a number of healthy individuals as well. Perhaps this microbe eventually acquires so great an increase in its vitality that it thrives not only in healthy persons, but also may be able by itself to produce infections resembling influenza. When the influenza dies out Pfeiffer's bacillus may exist in normal people for some months still, but as it is incapable of living for a prolonged period as a pure saprophyte it will, as before the influenza appeared, gradually be limited to occurring in endemic diseases."

The advantage of this conception is that, as Kristensen claims, it accounts for the whole of the observed facts; in particular it has the merit of explaining why in certain outbreaks of influenza Pfeiffer's bacillus has not been found when searched for by bacteriologists of great experience in the detection of this micro-organism employing technique that is above suspicion, as proved by the excellent growth of Pfeiffer's bacillus when material containing it is available. Should further investigations substantiate this wide view of the pathogenic significance of Pfeiffer's bacillus it may eventually become desirable, as has been suggested, to change its pre-war name of *B. influenzae* to that of *B. catarrhalis*. The observations of Kristensen, however, fully substantiate the frequency of the occurrence of this bacillus in cases of influenza, and demonstrate in a striking manner the close association between epidemics of that disease and the carrier rate of Pfeiffer's bacillus. Accordingly, the prophylactic use of a vaccine of Pfeiffer's bacillus obtains material support from these comprehensive and well planned studies of recent outbreaks of influenza in Denmark.

British Medical Journal.

SATURDAY, JANUARY 20TH, 1923.

THE INFLUENCE OF PASTEUR ON SURGERY.

IN an article in this column last week we endeavoured to give some general account of Pasteur's work, especially his earlier work with regard to crystallography and fermentation, and only brief reference was made to the manner in which the lessons to be learnt from his discovery of the specificity of micro-organisms, and his repudiation of spontaneous generation, were applied and extended by Lister to the prevention of wound infections. Pasteur had to meet very great opposition from many quarters, for he was proving that opinions held by the highest authorities in science were wrong; incidentally he upset the beliefs of the chief surgeons of the day, whose practical methods were based on tradition, which their clinical observations appeared to confirm. Pasteur's experiments, as all open-minded surgeons had to recognize, disproved ideas regarding fermentation that had been used to explain inflammation in wounds. Although they themselves did not undertake to cultivate the micro-organisms which occurred in infected wounds, they could not remain unconvinced when these micro-organisms were made visible to them under the microscope (the construction of which was just then greatly improved) and when Lister added demonstration to demonstration that if wounds were kept free from infection they healed speedily in a natural manner.

The most sceptical found it no longer possible to deny specificity, and gradually ceased to talk of dirt in terms implying spontaneous generation, or of the change of one species of micro-organism into another. The old constitutional pathology was reduced to a place of secondary importance. As Pasteur pursued his researches he supplied a new interpretation of the proverb that "the better is the enemy of the good." Lister began his improvements in surgery by seeking to prevent infection of wounds from the air, using chemical antiseptics for this purpose. Pasteur furnished his followers with methods by which the cause of the infection of wounds was traced to the patient's skin, the surgeon's hands and his instruments, as sources of more immediate importance, especially after improvements in sanitation had been made. Pasteur invented in the laboratory the methods of sterilizing fluid and solid materials which gradually were introduced into the practice of surgery. Die-hards had to yield to the fact that infection of wounds was preventable, even when the surrounding circumstances were unfavourable. Pasteur often quoted the remark made in 1667 by Robert Boyle, in his *Sceptical Chymist*, that he who could probe to the bottom of the nature of ferments and fermentation would probably be more capable than anyone else of explaining certain morbid phenomena.

The discovery of oxygen and its properties had supplied the basis of the explanations of fermentation current during the first half of last century. Liebig continued to use such vague phrases as that putrefaction was an inherent tendency to decay. Oxygen, he said, caused a change for which he proposed the term "eremacausis," a word recent dictionaries omit, but which he applied to the slow oxidation and combustion that goes on in the decay of organic compounds at ordinary temperatures. Berzelius explained fermentation as a catalytic process, a term not only vague but erroneous, for it meant a change in composition effected in a body by the mere presence of another which does not itself undergo any change. Pasteur demonstrated that the decomposition was produced by micro-organisms which did undergo changes. In 1862 Billroth, one of the most prominent surgeons of the day, supported the hypothesis that infection of wounds was due to decomposing materials similar to vegetable poisons (belladonna, strychnine, curare) and to snake poisons. The arguments then used turned on simple methods of filtration and distillation involving a number of fallacies, procedures which Pasteur's manipulations and apparatus superseded.

Nothing was more difficult than to counter the tradition which put the constitutional causation of disease in the forefront, and at the same time ignored causation by contagion and infection. The history of the discovery of the cause of scabies may be recalled because the agent is just visible to the naked eye. Aristotle said (*History of Animals*, v, 31): "Of insects that are not carnivorous, but that live on the juices of living flesh, such as lice and fleas and bugs, all without exception generate what are called 'nits,' and these 'nits' generate nothing. When lice are coming there is a kind of small eruption visible, unaccompanied by any discharge of purulent matter; and if we prick an animal when in this condition at the spot of the eruption the lice jump out." Avenzoar described the little lice, or acari, which creep under the skin of the hands, legs, and feet, causing pustules full of fluid. The insect was drawn repeatedly and with increasing accuracy, and Galès in 1812 was given a prize for observing, through a watch-glass covering the acarus, the actual penetration of the cuticle. Unfortunately some drew cheesemites, or the *Acarus farinae*, and caused confusion. In spite of the numerous observations which had been made, Hebra in 1842, when describing his experience concerning 2,177 cases of scabies out of a total of 2,723 in his skin department, said that there was a special itch dyscrasia which resulted in the spontaneous generation of the insect in the lymphatics; two years later, however, he had reconsidered the facts and accepted the acarus as the cause of scabies.

The size of the anthrax bacillus facilitated its demonstration, for it was readily made visible under the microscope. The disease had long been known to be both contagious and inoculable, and that not only in cattle. Passing by earlier references, it may be noted that Saporta (1624) said that there was a form of carbuncle which frequently attacked butchers and their families, owing to contagion from the skins and offal of diseased sheep. Larrey noted its occurrence in a butcher's family at Paris, and among soldiers at Toulon who had been stung by flies. He was well aware that butchers, tanners, and cooks were more frequently attacked, yet he shut his eyes to the evidence of inoculation and assumed the cause to be foul air, change of weather and season, and the predisposition of the individual, both in men and animals. In 1838 Delafond saw little rods in the splenic blood, and this was again noted by Pollender in 1849 and confirmed by Davaine. Delafond carried out a number of inoculations on animals. Yet it was not until 1860 that Davaine, after reading Pasteur's paper on butyric acid fermentation, in which it was proved that organisms caused the fermentation, began to connect the rods with the cause of anthrax and to resume experiments on the subject. These in turn attracted the notice of Dr. William Budd of Bristol, who, at the meeting of the British Medical Association in London in 1862, described for the first time the occurrence of malignant pustule in England.

Lister, after his appointment in 1860 to be Professor of Surgery in the University of Glasgow and surgeon to the Infirmary, began to teach that the primary cause of suppuration in wounds was the decomposition brought

about in them in some way by the air, in contradistinction to the theories which referred to changes in the blood. The risk of infection through the air at first formed the basis of the practice of subcutaneous surgery. A crucial instance was the difference between a crush of the thorax causing fracture of ribs, pneumothorax, and surgical emphysema, and a penetrating wound of the chest. Following upon that a parallel may be drawn between the researches of Pasteur and the institution by Lister of his antiseptic system. Many surgeons of the first rank, however, continued to express satisfaction with what they called "cleanliness." Those who recall the controversy recognize that Lister directed the surgeon's primary attention to the methodical prevention of infection. At one of his demonstrations to the British Medical Association he said: "In order, gentlemen, that you may get satisfactory results with this sort of treatment, you must be able to see with your mental eye the septic ferments as distinctly as we see flies or other insects with the corporeal eye. If you can really see them in this distinct way with your intellectual eye, you can be properly on your guard against them; if you do not so see them you will be constantly liable to relax in your precautions."[1]

Lister learned from Pasteur's experiments that putrefaction and fermentation were set up by minute living organisms, and that the idea that the cause lay with the oxygen or some gaseous constituent in the atmosphere was erroneous. Without neglecting precautions coming under the head of cleanliness, Lister directed his attention to the exclusion or destruction of living particles floating in the air. From that he developed his antiseptic system—the application of solutions of carbolic acid to the wound, the carbolized dressing for covering the wound, the steeping of the silk or catgut ligatures, the covering of the instruments in carbolic acid solutions, and the spray to protect from the surrounding air during the operation. Now Pasteur's researches least supported Lister as regards the spray and the application of carbolic acid to previously uninfected wounds, and as a matter of history these were the first parts of the system to fall into disuse.

Pasteur originated the researches which led up to the recognition of streptococci and staphylococci as the chief infective agents of wounds. He intervened first in the discussion as to the cause of the fatal kinds of puerperal fever, such as are now recognized to be set up by haemolytic streptococci. Semmelweis had made a statement of a limited character, that the infection was due to a miasma given off by lying-in women and their infants, particularly after death. It was "infant miasma" infecting the slight wound of his finger whilst operating on a newborn infant which started the deterioration of his health. There had been repeated discussions, in Paris especially, on the so-called epidemics in maternity hospitals, and at one of the debates on the subject in 1878 Pasteur interrupted the speaker, saying, "None of the things that had been enumerated caused the epidemics, but it was the nursing and medical staff who carried the microbe from an infected to a healthy woman." This was indeed a provocative statement, to which the speaker retorted that he feared the microbe would never be found. Pasteur thereupon drew on the blackboard the chain-like organism, saying, "There, that is what it is like." When visiting by invitation a lying-in hospital he declared that all the soiled linen should be put through a sterilizing apparatus. He pricked the finger of a woman suffering from puerperal fever and demonstrated the chain-like organism in the blood. A worker in Pasteur's laboratory suffered from boils; Pasteur isolated from the furuncle the microbe by growing it in sterilized broth, and confirmed the observation in two other cases. He was present when Lannelongue, at the Trousseau Hospital, was operating on a little girl suffering from acute osteomyelitis. He took some of the pus and isolated the same organism as in the cases of furuncle. "It may," said Pasteur, "be affirmed at first sight that osteomyelitis is the furuncle of bone." Early in 1881 Ogston described in the BRITISH MEDICAL JOURNAL how he had found the staphylococcus in every acute abscess.

Then followed the International Congress in London in the summer of 1881, which marked the general acceptance of the researches of Pasteur, Koch, and others, expressed on behalf of surgeons headed by Lister, Lucas-Championnière, and Volkmann. The cultivation of micro-organisms on solid artificial media, and the demonstration of the organisms rendered visible under the microscope by staining, afforded indisputable evidence; in the surgical discussions on the same occasion the success of Lister's antiseptic methods was amply proved. Modifications subsequently introduced were founded upon the sterilizing methods invented by Pasteur. In 1878 he had recommended the flaming of instruments, the sterilizing by moist heat of tow, wool, and pads (used instead of sponges), of dressings and bandages, and the employment of water sterilized by boiling under pressure at 110° to 120° C. In 1882 Neuber of Kiel, among others, set himself to test the sterility of everything connected with surgical operations. The researches of Schimmelbusch and their practical application were fully demonstrated at the International Medical Congress in Berlin in 1890. The laboratory methods employed by Pasteur had become, and continue, an essential part of surgical apparatus.

On December 27th, 1892, Pasteur had reached his 70th year, and a great ceremony was held at the Sorbonne, when Lister delivered an address in French, which is to be found in full in Sir Rickman Godlee's *Life of Lister*. The account is illustrated by a photograph of the central portion of Rixen's picture representing the scene which followed: "M. Pasteur se lève pour embrasser M. Lister. L'étreinte de ces deux hommes était comme la représentation vivante de la fraternité de la science dans le soulagement de l'humanité."[2]

[1] *The Collected Papers of Joseph, Baron Lister* (Oxford: Clarendon Press, 1909), p. 258.

[2] Pasteur rose to embrace Lister. The embrace of these two men was, as it were, a living picture of the brotherhood of science in its effort to lighten the burden of humanity.

WAR INJURIES AND LIFE ASSURANCE.

WAR casualties—both surgical and medical—have presented many problems to those responsible for the medical side of life assurance. In all such cases the difficulty lies in the attempt to steer an even course between two opposing interests—that of the proposer on the one hand, of the insurance company on the other. In the ultimate issue these interests tend to become identical: the prosperity of a company depends on the wise medical selection of its policy-holders, who, in turn, provided their policies are participating ones, profit by the company's prosperity. But when the medical assessor is confronted with an individual proposer in impaired health, his problem is as indicated—to advise terms of acceptance which, while giving the company reasonable protection, shall be equitable to the proposer. How is he to arrive at his decision? In theory he should have at his command the results of actuarial mortality investigations of groups of people suffering from the impairment in question. For example, to assess a case of "foreign body in the lung," he should have a mortality table showing the experience, in the form of the ratio of "actual" to "expected"

deaths in successive years, for a group all suffering from this condition and large enough to exclude the influence of accidental factors. In point of fact, for the great majority of impairments, such information is unavailable, and the assessment of the risk becomes almost entirely an empirical process, depending upon the experience and judgement—not infrequently also upon the prejudices—of the individual assessor. It is particularly in the case of war injuries that the data are so scanty: the number of cases of impairment of this type coming for insurance under normal peace conditions has been so small that the actuarial experience relating to them is almost *nil*.

It is not surprising, therefore, that the Assurance Medical Society has devoted considerable attention to the question, and its members have discussed the problems arising from the war on several occasions during the last four years. At a recent meeting papers on this subject by Mr. W. McAdam Eccles and Mr. G. E. Gask gave rise to an interesting discussion. The former, in his paper, "Further experiences of war wounds in general in relation to life assurance," makes an heroic attempt to classify all war injuries, according to their topography and chief features, and to indicate how these should be regarded for life insurance purposes. On the whole, his views appear to have been generally approved by the other members taking part in the discussion, though naturally there was some criticism on points of detail. At first sight, especially to those who have worked on Pensions Boards, some of his recommendations may seem a little unexpected, but the problems are, of course, fundamentally different in the two cases. The Pensions Board is concerned almost entirely with the man's capacity for work; the insurance assessor, on the other hand, has regard only to the "expectation of life." Hence a man who has been blinded by loss of both eyes is assessed for pension at 100 per cent., while, for life assurance purposes, he will be accepted, if well in other respects, with only a small addition to cover the extra risk of death from accident. Similarly with the loss of, or injury to, limbs. Thus, with an arm rendered useless through injury to its main nerves, Mr. Eccles rightly recommends acceptance at ordinary rates, as he does also in the case of loss of the whole of the arm, or of one leg from the knee downwards. For the loss of one leg through the thigh or hip, however, he suggests a load of 3 to 5 years' addition to the age. This is perhaps justified on the score of increased liability to accident, but, with the excellent artificial limbs now widely available, a good case might be made out for the acceptance at ordinary rates of all war cases of loss of one leg, provided that the general condition is good. To our knowledge such cases have been accepted by more than one company, and it is improbable that they will be called upon to repent their boldness. With the loss of both legs the case is perhaps rather different. Here Mr. Eccles advises an addition of from 3 to 10 years, according to the level of amputation. It has been suggested that, in addition to the risk of accident, there is a further danger of impaired health in later years owing to the more or less inactive life imposed by the disablement. In the case of many of the young soldiers who have lost two legs this hardly applies. Their activity is wonderful. Many of them, with two artificial legs, manage to walk quite well without even a stick, and with a barely perceptible limp. Such cases might quite reasonably be considered as ordinary risks, particularly for short-term endowment assurances.

One of the most interesting topics in connexion with war wounds is that of epilepsy arising from head injuries. Dr. Aldren Turner, in the discussion, threw valuable light on this somewhat obscure problem. He pointed out that most of the cases of traumatic epilepsy due to war injuries were of the "generalized" type—a general convulsion with loss of consciousness—as opposed to the "Jacksonian"; if the latter developed as the result of a definite focal cortical lesion, it was usually amenable to surgical treatment. But traumatic epilepsy was, in any case, a comparatively infrequent sequel of gunshot wound of the head. The Ministry of Pensions records gave its occurrence as about 800 in 18,000 cases—that is, about 4.5 per cent. In most of these it developed within eighteen months of the injury, and in the majority of these there was evidence of some predisposing neuropathic history—personal or familial. Dr. Turner thought that, provided the fits occurred only at long intervals—one or two a year—insurance might be effected with only a small addition; if the fits were frequent—several in a month—the proposal should be rejected or, at least, heavily loaded. The outlook in the Jacksonian cases he regarded as more favourable than in the generalized ones, as, apart from the possibility of surgical cure, they exhibited a greater tendency to spontaneous improvement.

Mr. Gask's paper deals with "War wounds of the chest and their late prognosis in relation to life assurance." Its chief interest lies in the consideration of cases of a missile retained in the lung or mediastinum. If the missile is a smooth one, such as a rifle bullet or shrapnel ball, it is less likely to cause trouble than is a jagged fragment of shell. There have been several cases of haemoptysis due to ulceration from such a fragment five or six years after its entry. Such cases should therefore be taken only with a considerable loading, though it was agreed that there is no reason at all to suppose that the presence of these foreign bodies predisposed to the development of pulmonary tuberculosis. Both papers are of great interest and should be of real value to the medical officers of life insurance companies. We should like to give our hearty support to Mr. Eccles's suggestion that, in dealing with these war casualties, the offices should as far as possible give the benefit of the doubt to men who have been disabled in the service of their country.

ETIOLOGY OF RICKETS.

ALL who are interested in the problem of the causation of rickets will be grateful to Professor V. Korenchevsky for his report on the etiology and pathology of rickets which has just been issued by the Medical Research Council.[1] It is a careful and reasoned summary of the extensive literature dealing with the causation of rickets, followed by an account of the results of his own researches. Those who have studied the literature on rickets will know that it is very scattered and extremely contradictory. In particular, failure to agree as to which bony changes constitute true rickets has been a frequent source of dispute in experimental work upon animals. Professor Korenchevsky gives references to about 400 investigations, and has analysed the results carefully and critically; in many cases where investigators have arrived at conflicting conclusions he is able to show that the experimental or clinical observations are not necessarily contradictory.

The chief points dealt with in the report are the histological changes in the skeleton in rickets and osteomalacia, calcium metabolism in normal and rachitic subjects and the effect of calcium starvation in producing rickets in animals, and the influence of the antirachitic factor and of light upon the development of rickets in animals and children.

The bony changes produced respectively by rickets and by calcium starvation are considered at length. Professor Korenchevsky has performed numerous experiments to ascertain the effect on rats of calcium

[1] *The Aetiology and Pathology of Rickets from an Experimental Point of View.* By V. Korenchevsky, M.D. Medical Research Council Special Report No. 71. 1922. H.M. Stationery Office. (8vo, pp. 172; 18 plates. 4s.)

starvation, and the resulting bony changes are illustrated by forty-one figures of histological preparations. His conclusion is that "in some cases it may be possible, by calcium starvation, to produce a disease which clinically, chemically, macroscopically, and even histologically, may simulate rickets."

It is usually believed that calcium starvation causes osteoporosis, and that in rickets there is overgrowth of osteoid tissue. Professor Korenchevsky shows that the development of osteoid tissue depends upon the general rate of growth of the organism, and in particular upon the rate of growth of the bones, and that in a growing child rickets causes development of osteoid tissue, whilst if growth has been arrested rickets causes osteoporosis. These conclusions explain a large number of the discrepant results obtained in experimental work, for typical rickets can be produced only when, on the one hand, the deficiency in the diet is sufficient to interfere with the deposition of lime in the bones, but, on the other hand, is not sufficient to arrest growth. The evidence as to the changes in calcium metabolism in rickets is fully considered, and Schabad's view is accepted. This is that the initial change in rickets is a derangement of calcium metabolism, that there is a latent period in which the calcium metabolism is negative, but in which there are no demonstrable bony changes, and that during the later stages, when the bony changes are most manifest, the calcium metabolism is usually positive. The statement that the latent phase of rickets may arise during the first two months of life is very important, for it indicates that ante-natal factors are of importance in the causation of the disease. It is interesting to note that the normal breast-fed infant utilizes nearly 60 per cent. of the calcium in its food, whilst the rickety child may lose as much as one-third of the amount of calcium present in its body at birth. With regard to the influence of phosphorus metabolism upon rickets, the conclusion of McCollum and his co-workers, that the ratio between the amounts of phosphorus and calcium in the diet is of great importance, is quoted.

The influence of an antirachitic factor, possibly identical with vitamin A, upon the occurrence of rickets has been the subject of acute controversy. Professor Korenchevsky reviews the literature and also describes a series of his own experiments on rats fed on diets deficient in animal fats. He concludes that "the influence of animal fat is due to one or more active principles dissolved therein. The action is threefold: (*a*) to control nutrition and growth of the tissues (including cartilage and bone); (*b*) to control calcium metabolism and calcium deposition in the skeleton; (*c*) to maintain the appetite. These various actions are manifested in different degrees in individual experiments, and the disturbance of ossification is modified accordingly. . . . A deficiency of the antirachitic factor in the diet of the mother results in a marked aggravation of the skeletal disorders of the offspring kept on a diet similarly deficient." Professor Korenchevsky rightly emphasizes the important influence of the rate of growth upon the development of rickets, and holds that this factor helps to explain some of the discordant results obtained by different workers. The fact that ante-natal conditions may influence the development of rickets introduces an additional variable into this already complex problem. Most readers will probably be surprised to learn from Professor Korenchevsky's review of the literature that as early as 1904 Buchholz had shown that light produced a curative action upon rickets.

We have said enough to indicate the extraordinarily complex nature of the problem of the causation of rickets. At least half a dozen factors appear to be of importance, and the influence of every factor has been the subject of acute controversy. Moreover, the discovery of a new factor, such as the influence of a fat soluble antirachitic substance, often invalidates a large number of previous investigations made to determine the influence of other factors.

Professor Korenchevsky has summarized this large mass of confusing literature very clearly and very impartially, and his own experiments throw considerable light upon various important points. It is of course impossible in such a subject to produce conclusions that will meet with universal acceptance, but everyone will feel grateful to the author for having given an orderly review of a difficult subject.

VICTOR HORSLEY MEMORIAL LECTURE.

It will be remembered that a committee was formed in 1920 by the friends and colleagues of Sir Victor Horsley to take steps to commemorate his services to science and the empire by the foundation of a lectureship or scholarship bearing his name. The tragic circumstances of his untimely death while on service with the army in Mesopotamia, on July 16th, 1916, are still fresh in memory. He was a pioneer in the research work connected with the surgery of the brain and nervous system, and brilliantly applied his own observations to the alleviation of conditions due to lesions of the brain and spinal cord, especially those produced by tumours and trauma. He was also one of the earliest to study the relation of the thyroid gland to myxoedema, and his investigations of rabies were of the utmost value as proving the possibility of stamping out the disease in Great Britain. He gave time and energy freely to the British Medical Association, in the last reorganization of which he was a prominent figure. Subscriptions were received by the committee from all over the world, and a sum of over £1,000 was collected. The committee, over which Sir Charles Ballance, K.C.M.G., F.R.C.S., presided, and of which Sir Frederick Mott, M.D., F.R.S., was treasurer, resolved that the sum should be invested in the name of a board of trustees, who should triennially appoint a person to deliver a lecture in London under the title of the Victor Horsley Memorial Lecture. It was also decided that no limitation should be placed on the trustees as to the country or profession from which the lecturer should be appointed, nor as to the subject of the lecture. We are now informed by Mr. Edward Domville, who was one of the secretaries of the committee, that Sir Edward Sharpey Schafer, Professor of Physiology in the University of Edinburgh, has accepted the invitation of the trustees to be the first lecturer, and that the lecture will probably be delivered in the autumn.

VIRGINIBUS PUERISQUE.

THE Board of Education is issuing at the close of this week the report of the Consultative Committee on Differentiation of the Curriculum for Boys and Girls Respectively in Secondary Schools.[1] The Committee, whose work was suspended during the latter half of the war, was reconstituted by Order in Council in July, 1920. Two questions were then referred to it for inquiry and advice: (1) Whether greater differentiation is desirable in the curriculum for boys and girls respectively in secondary schools. (2) What use can be made in the public system of education of psychological tests of educable capacity? The report now published sets out the results of the Committee's inquiries on the first reference. Among those who gave evidence were medical men and women, psychologists, schoolmasters and schoolmistresses, inspectors and representatives of examining bodies, bankers, business men, and employers. Among the appendices is a memorandum by Dr. J. G. Adami, F.R.S., Vice-Chancellor of the University of Liverpool, a member of the committee, on anatomical and physiological differences between the sexes. He considers that the facts justify the conclusions that "girls in general are not so strong physically as boys; that they are more highly strung and

[1] London: H.M. Stationery Office. 1923. Price 2s. 9d. net. Pp. 191.

liable to nervous strain, which very possibly is associated with the fact that physiologically they are liable to heavier drains upon the circulating calcium of the blood; and that with their thinner blood, with lowered haemoglobin content, after puberty they are nearer to the threshold of anaemia." The recommendations of the Committee include some looking to further inquiries in several directions. Among these are the relative susceptibility of boys and girls to mental and physical fatigue, and the character of the games and physical exercises most suitable for girls of varying ages. It is further advised that research should be undertaken by psychologists and teachers on groups of boys and girls respectively, drawn from secondary schools of different types, in order to collect data in regard to the intellectual and emotional differences between the sexes in their bearing on education and as to the achievements of groups of boys and girls in the various subjects of the curriculum at successive stages of school life. It is also advised that further consideration should be given to the whole problem of the curriculum and organization of junior schools and departments, more particularly in its bearing on the future education of the pupils, especially in girls' schools. We hope to discuss the general features of the report in an early issue.

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

AMONG the duties cast upon a medical officer of health by successive orders of the Local Government Board was that of making an annual report to the local authority he served on the sanitary circumstances, administration, etc., of his district; the orders enumerated in some detail the information which the report should contain. It was for many years the custom of the medical officer of the Board at the end of each year to address a communication to medical officers of health drawing their attention to the requirements of the latest order and asking for such additional information as the advances in knowledge of public health might suggest. The Minister of Health has altered this procedure somewhat, and the Sanitary Officers Order, 1922, states that the report must contain such information as may from time to time be required by the Minister. In anticipation of the making of this order officials of the Ministry in 1921 conferred with the Society of Medical Officers of Health as to what information might most usefully be supplied. As a result it was decided that certain information which did not vary much year by year should only be inserted about every five years in what would be called a survey report. An agreement was also reached as to what might appear in an ordinary report. At the end of 1921 the Minister accordingly issued a circular in which he particularized the minimum information he considered desirable. A similar circular, dated January 10th, 1923, has been issued with reference to the reports for 1922. It does not differ very materially from the earlier document. It contains a statement not previously made which will be welcomed by medical officers of health, to the effect that the statistical information rendered by the Registrar-General will be distributed at the end of February or the beginning of March. If this promise is fulfilled a medical officer of health ought to find no difficulty in completing his report by the middle of April, and it is pointed out that the value of a report to all those concerned is greatly reduced if it is not completed shortly after the end of the year to which it relates. For many years it was the practice of the Home Office to ask medical officers of health to complete a table relating to the administration of the Factory and Workshop Act, 1901, in their districts. Although this table has been discontinued, it is still the duty of a medical officer of health under Section 132 of that Act to report specifically in his annual report on the administration of the Factory Acts in workshops and workplaces. The specific information now required in the annual report is included under the headings of: general statistics; number of cases of notifiable diseases occurring during the year; causes of sickness; summary of nursing arrangements, hospitals, and other institutions available for the district; laboratory work; number and details of sanitary staff; housing; and sanitary administration. Under this last heading the medical officer of health is asked for the first time to state what action has been taken with a view to smoke abatement.

ERYTHREDEMA OR THE "PINK DISEASE."

ATTENTION has recently been called by Zahorsky to the "pink disease," in a paper contributed to the *Journal of the American Medical Association* (December 9th, 1922). This condition, to which the names erythredema and acrodynia are also attached, is a rare one occurring in children, and was first described in Australia, where it had been recognized for some time before it was formally brought to the notice of the profession in a paper communicated to the Tenth Australian Medical Congress by Swift. The disease usually commences with an erythematous rash of varying character—measly, scarlatiniform, or resembling erythema multiforme. There are also other well marked features, the child becoming fretful, peevish, and unhappy. After a few days the erythematous rash may fade, but tends to reappear. Evidence of some general disturbance is found in the fever—not always present—nausea and general itching of the skin, which, from the consequences of scratching, may become infected by pus cocci. Perhaps the most characteristic features of the disease are the changes in the hands and feet. The hands especially tend to assume a swollen bluish-red appearance likened to raw beef.

LES MALADIES PAR CARENCE.

THE term "maladies par carence" has recently been introduced into French literature to denote the group of diseases which includes those known in England as deficiency diseases. "Carence" is an old-fashioned legal term meaning bankruptcy or deficiency, and is derived from the Latin *carere*, to be without, to be destitute of. Professor G. Mouriquand and Dr. Weill, who introduced the term to medicine, define it as denoting diseases which are not caused by infection or intoxication nor by actual starvation, but which are due to a lack in the food of some substance or substances, a certain minimal supply of which is essential to animal life or health. They emphasize the point that deficiency may be due not only to the lack of some essential substance, but also to the substance occurring in some physico-chemical condition in which it cannot be assimilated. This is probably true, but the distinction between chemical change and an alteration in physico-chemical condition is extremely difficult to establish when considering the absorption and utilization of food substances, and therefore this point does not seem to be of any great practical importance. The inclusion in a common group of all deficiency diseases is, however, a sound suggestion. The rapid recent advance in the knowledge of vitamins and the dramatic nature of many of the new discoveries have focused attention upon the effects produced by vitamin lack, and there is a danger of the term "deficiency diseases" becoming restricted to diseases due to avitaminosis, whereas it is important to remember that the body requires for purposes of growth and repair a certain minimal supply of a large number of substances, and that deprivation of any of these will produce disease. The most obvious example of essential substances which the body cannot produce for itself are such elements as iodine and iron. Knowledge of the power of the body to synthesize organic compounds it needs is limited; we know, for example, that it cannot synthesize certain amino-acids, such as tryptophane and tyrosine, although these are essential components of every cell, and probably there are many other substances of which this is true. If the body is deprived of any essential compound which it cannot synthesize, disease and even death must result, and therefore the possible number of different deficiency diseases is indefinitely large. The types of disease which the French writers include under the term "maladies par carence" are: (*a*) diseases such as hunger oedema, due to insufficient fats and proteins; (*b*) diseases such

as pellagra, due to lack of essential amino-acids; (*c*) diseases due to lack of essential elements—for instance, the endemic goitre due to deficiency of iodides; (*d*) diseases, such as beri-beri, due to lack of vitamins. Deficiency diseases are probably almost unknown in animals living in natural surroundings, for the process of natural selection ensures that only those types of animals exist that can obtain a satisfactory supply of all their essential food requirements from easily available sources. Deficiency diseases, therefore, chiefly occur in civilized communities, for civilization is an attempt on the part of man to modify his environment, according to his own ideas, and often in defiance of natural forces. The process of urbanization has gone farther in England than in any other community, and this has brought diseases due to vitamin lack into prominence, for a large urban community lives to a considerable extent on food which has been subjected to special treatment to permit of its being transported and stored, and such treatment usually results in the elimination of the vitamins, for they are easily destroyed. Other highly interesting types of deficiency diseases occur, however. The introduction of maize as a staple article of diet in many different regions of the world has been followed in nearly all these regions by the appearance of pellagra; this is believed to be due to the fact that the proteins of maize are deficient in certain amino-acids essential to human nutrition. The inland regions of the United States have been seriously troubled by the appearance of endemic goitre, due to the complete absence of iodides in the soil of these regions; this is a striking example of the unexpected results that may follow the settlement of mankind in a new region. The experience of the past century certainly suggests that fresh advances in civilization may easily entail new experiments in diet which may bring to light new deficiency diseases. The vitamins have been brought into prominence on account of their ready destructibility; if they were not so easily destroyed we probably should not know that they existed. There are probably large numbers of other equally important substances, traces of which are equally essential to life, of which we know nothing because we have not heretofore been so unfortunate as to eliminate them from our diet.

THE MICROSPECTROSCOPE FOR THE DETECTION OF BLOOD.

THE value of the microspectroscope in the medico-legal detection of blood was demonstrated by Professor Harvey Littlejohn at a meeting of the Medico-Legal Society on January 16th. The spectroscope was, he said, first used in testing for blood in a criminal case about sixty years ago; it enabled the absorption bands characteristic of the colouring matter in blood to be recognized. With the microspectroscope it was possible to prove the presence of blood by several tests, each corroborating the others. It was sufficient to take only one strand of the cotton, linen, or other fibre which bore the stain, and place it on a moistened microscope slide, when, with the microspectroscope, the two bands of oxyhaemoglobin—one fairly dark, almost at the red end of the spectrum, and the other less definite, nearer the orange—would be seen. Certain dyes, however, gave practically the same spectrum, and therefore this first result had to be corroborated. If a stain was fairly recent, ammonium sulphide might be used as a reducing agent, whereupon the two bands would disappear and their place be taken by one dark band. Having used the ammonium sulphide, a little caustic soda was added, whereupon the spectrum of haemochromogen—the most characteristic of all blood spectra—was elicited. If the small stain, instead of being on a fabric more or less transparent, was on a dark coat, the portion could be soaked in water, and the little hairs with blood particles clinging to them teased out. Having focused one of these hairs under a high power of the microscope, the spectroscope was brought into use, and the sequence of spectra again demonstrated. When the stain was old the haemoglobin became transformed into methaemoglobin, which had a characteristic spectrum; but here again—following the use of ammonium sulphide and afterwards of caustic soda—possibly the second, and in any case the third in the series of spectra (that of haemochromogen) was obtained. Even from a single haemochromogen crystal the absorption band could be made out. It was possible to carry the test even farther. Having got the spectrum of haemochromogen, the ammonium sulphide and the caustic soda could be soaked out, and sulphuric acid added, giving another spectrum, and a very important one under certain conditions of blood examination, that of acid haematoporphyrin, consisting of one sharp band in the orange and another farther towards the purple. Then, washing the sulphuric acid away and adding caustic soda again, the spectrum of alkali haematoporphyrin was visible. Thus from one speck of blood it was possible to get four or five consecutive spectra, each of them characteristic. Professor Littlejohn added that certain microspectroscopes now produced were perfect instruments, but costly. With a minimum of adaptation, however, it was possible to use a small hand spectroscope; the object having been focused, the spectroscope was attached, making an arrangement capable, if not of the most delicate tests, at all events of some very useful ones. In a brief discussion following the demonstration, Sir William Willcox spoke of the value of the spectroscopic method as a confirmatory test, and Mr. Webster agreed, but thought the chemical test for haemin crystals, provided it was carried out with strong glacial acetic acid, the most important of all. Professor Littlejohn, however, expressed the opinion that the microspectroscope might well supersede all other tests. He regretted that the textbooks gave so little information about the use of the microspectroscope; the current edition of one well known work on medical jurisprudence did not even mention it, and other books gave no details.

DR. WALTER ELLIOT, M.P.

THE official announcement was made on January 15th that the Secretary for Scotland has appointed Captain Walter E. Elliot, M.C., M.P., to be Parliamentary Under Secretary for Health for Scotland, in the place of Mr. James Kidd, resigned. Mr. Kidd was one of the six members of the newly formed Government (including Sir Arthur Griffith-Boscawen, Minister of Health) who were defeated at the last General Election. Dr. Elliot graduated in medicine at the University of Glasgow in 1913, and obtained the degree of D.Sc. last year. He served with distinction throughout the war with the rank of Captain R.A.M.C. (Special Reserve); he was wounded in France and won the Military Cross with bar. He has represented the Lanark Division of Lanarkshire since the General Election of 1918, and during the past four years has done admirable work in the House of Commons, serving on many committees and ably representing the medical point of view. Since 1920 he has acted as private secretary to the Scottish Under Secretary for Health; he has been honorary secretary to the Committee of Medical Members of Parliament, and for some time Parliamentary honorary secretary of the Research Defence Society. In virtue of his new appointment Dr. Elliot becomes Vice-President of the Scottish Board of Health—a position of some immediate difficulty owing to the Board's attitude towards certain professional matters, more especially the salaries of public health posts in Scotland. That he will use his influence in the right direction may be predicted from the manner in which he has already handled medical affairs in Parliament and the readiness with which he has always put his help at the disposal of the British Medical Association.

IN response to the second appeal by the officers of the British Medical Association for funds for the relief of starving Russian doctors and their families £267 9s. 6d. has been received. The first appeal produced a total of £1,605. Further subscriptions of 5s., or multiples of 5s., are urgently needed. They should be sent to the Financial Secretary, 429, Strand, London, W.C.2.

WAR MEMORIAL

TO

MEMBERS OF THE BRITISH MEDICAL ASSOCIATION WHO GAVE THEIR LIVES IN THE WAR, 1914–1918.

It has already been announced that the Council of the British Medical Association has decided that the memorial to members who gave their lives in the war of 1914–1918 shall take the form of a Book of Honour to be placed in the library, a memorial tablet in the entrance hall, and a small book for issue to relatives describing the Book of Honour.

Mr. F. G. Hallett, Secretary of the Conjoint Examining Board in England, who prepared the illuminated testimonial presented to Sir Clifford Allbutt at the Annual Meeting last year, has generously undertaken, as a labour of love to the profession, to illuminate the roll and superintend the engrossing of the names. He submitted to a meeting of the special committee appointed to make arrangements for the memorial a sketch of the first page or frontispiece of the roll. This bears a very beautifully illuminated dedication, the phrasing of which is reproduced in the accompanying tablet.

1914 **Pro Patria** 1918

BRITISH MEDICAL ASSOCIATION.

ROLL OF HONOUR
OF THE
MEMBERS
WHO GAVE THEIR LIVES FOR THEIR
KING AND COUNTRY
IN THE GREAT WAR

At the going down of the sun
and in the morning we will
remember them.

The scheme of the illumination was greatly admired and Mr. Hallett was asked to complete it. He also submitted two specimens of a page of the names engrossed; one of these was unanimously preferred, and Mr. Hallett was asked to arrange that the engrossment should be proceeded with as soon as the list of names could be completed. A list has been prepared which is believed to be complete, but it is of course very possible that some names may have been omitted. The first instalment is printed below, and it is hoped that members will be good enough to look through the list and notify any additions or corrections that should be made, and, in particular, will verify the correctness of the christian names, as in some instances difficulty has been encountered in ascertaining them. Corrections or additions should be sent as early as possible to Mr. L. Ferris-Scott, Financial Secretary, British Medical Association, 429, Strand, London, W.C.2.

THE ROLL OF HONOUR.

Ackroyd, Harold, V.C.
Acland, John Henry Dyke
Aitken, James
Almond, George Hely-Hutchinson
Anderson, George Grantham
Annesley, James Ferguson St.John
Armstrong, Arthur Keith
Arthur, David
Aspinall, William Robert
Atkinson, Ambrose
Atkinson, Charles Mason
Austen, Thomas
Austin, Elfred Chalmers
Austin, John Henry Edward
Ayre, Frederick John

Bailey, Guy Brooke
Bailey, James Connor Maxwell
Baker, Cecil Robert Moorshead
Baldwin, Francis John Augustus
Ball, Sir Charles Bent
Ball, Malcolm Edward
Barker, Arthur Edward James
Barnes, Raglan Wykeham
Barr, Hugh
Batchelor, Ferdinand Campion
Battersby, John
Baxter, Alexander Kidd
Beale-Brown, Thomas Richard
Bean, Harold Knowles
Bearblock, Walter James
Begg, Charles Mackie
Begg, Henry
Beilby, Julius Henry
Bell, Edward Augustine
Bell, James Alexander Terras
Bell, John Cunningham
Benham, Charles Henry
Benson, Alfred Hugh
Bharucha, Rustim Hormasji
Bingham, Frank Miller
Bingham, John Warnock
Birley, Hugh Kennedy
Birrell, William George
Blair, Edward James
Blake, Cecil
Blandford, Joseph Whitfield
Blandy, Francis Dawson
Blandy, Gurth Swinnerton
Bogle, Gilbert Vere
Bonnycastle, Richard Henry
Booth, Ainslie
Bostock, Robert Ashton
Bower, William Charles Ernest
Boyd, James Stanley Newton
Bradley, Frederick Hoysted
Braide, George Frederick William
Brice, Ernest
Bridges, Roland Harley
Brock, George Selby
Brown, John Ritchie
Browne, Bernard Score
Brydon, John Earnsleigh
Bulkeley, Llewelyn Alfred Henry
Bullen, Norman John
Burden, Clive Britten
Burges, James Alexander Stewart
Burgess, Duncan
Burnet, Robert
Burnett, Maurice
Buxton, Gurney White

Calvert, William Hall
Campbell, Archibald Thomson
Campbell, John
Campbell, Roland Playfair
Capps, Frederick Albert
Center, William Rudolph
Chaning-Pearce, Wilfrid Thomas
Chaplin, Harold Garrett
Childe, Letterstedt Frederick
Chiles-Evans, David Brynmor
Churchill, Arthur Lindsay Maury
Clark, Sydney
Clarke, Gother Robert Carlisle
Clarke, John
Cleland, Frank Lee
Clemens, Frederick William Theodore
Cocke, Robert Sturgeon
Cockin, Reginald Percy
Coghill, Harold Sinclair
Cohen, Benjamin
Collie, Mackintosh Alexander Thomas
Collins, Henry Beale
Collins, Reginald Thomas
Compton, William Henry
Conyngham, Cecil Taylour
Corley, Anthony Purdon Hagarty
Cowe, Archibald
Cowie, Graham Robertson
Cox, Edmund
Craig, William Maxwell
Crocket, John
Crole, David Clement
Crombie, William Maurice
Cropper, John
Cross, John
Cruickshank, Malcolm Ogden
Cummings, William Gordon
Cunliffe, Ernest Nicholson

Dalby, Herbert Ernest
D'Alton, Charles
Daly, Thomas
Dauber, John Henry
Davie, James
Davies, Frederick Charles
Deane, Edward Wilkinson
Deans, William Wilkie
Delamere, Percy Herbert
Demetriadi, Louis
Deravin, Arthur Francis
De Verteuil, Fernand Louis
Dickson, Robert Cecil
Donald, Robert
Drennan, Robert Hugh
Drury, Francis James
Dudley, Samuel Robert
Duggan, Charles William
Duncan, Sydney Edward
Dunkerley, Harold
Dunlop, George Harry Melville
Dunn, Arthur Gibson
Dwyer, James Jameson

Eccles, Horace Dorset
Edsell, George Alfred
Elliott, John Forster
Ellis, George Reginald
Ellison, Samuel Charles
Engineer, Gustadji Shapurji
Eve, Sir Frederic Samuel
Everett, William

Fairley, James Fairbairn
Fearnsides, Edwin Greaves
Fedarb, Frederick
Fehily, Thomas Joseph
Ferguson, Philip
Fisher, Edward Garlick
Flashman, James Froude
Fleming, Charles Christie
Fletcher, Guy Verney
Flux, George Belben
Ford, Arthur Vernon
Ford, Ernest George

Forster, Laura
Fortune, John
Fox, Arthur Claude
Freeman, William Thomas
Frew, Robert Dunlop Black
Furness, James Collins

Gabbett, Pulteney Charles
Gage, John Munro
Gardner, Alfred Linton
Garnet, Wade Shenton
Gaston, James
Gaunt, Eric Thomas
Gavin, Neil Murphy
Gavin, Noel John Hay
Gem, William
Geoghegan, Herbert Lyne
German, Frederick Francis
German, Hugh Bernard
Gerrard, Percy Netterville
Gibb, William Alexander
Gibbons, Wilfred Ernest
Giblin, Eric Louis
Gibson, Benjamin Digby
Gibson, Harold
Goodden, Henry Wyndham
Gorrell, Charles William Farran
Gough, Bernard Bradly
Graham, Stuart Millard
Graham, Walter Ap Samuel James
Graham, William
Grandage, William Briggs
Grant, Alexander William Harvey
Grier, William
Griffith, Harry Hunter
Griffith, Harry Rathbone
Griffiths, John Neville
Guthrie, Thomas Errol

Hairsine, Owen
Hall, Herbert Strange
Hallaran, William
Hamilton, Thomas William O'Hara
Harding, Norman Ernest Jaspar
Harper, James
Harris, Frederick William Henry Davie
Harris, Hubert Alfred
Harris, Joseph Cecil
Harris, William Trengweath
Harrison, Everard
Harrison, Frank Cecil
Harrison, Stanley Sextus Barrymore
Harrison, William Sandilands
Harrisson, Damer
Hartley, Arthur Conning
Hartnell, Edward Bush
Harty, James Johnson
Harvey, Alfred Wallace
Harvey, Gilbert Aberdeen
Hawes, Godfrey Charles Browne
Hawksley, Walter Linney
Hay, William Stevenson Brown
Hayward, Milward Cecil
Heard, Francis George
Heard, Geoffrey Richard
Hearne, William Weston
Hebbert, Robert Francis
Heffernan, Francis Joseph Christopher
Henderson, Ronald Lennox
Henley, Ernest Albert William
Hepworth, Wilfrid Joseph Harrison
Hesiop, Harold Linton
Hewetson, Samuel William
Hewson, Falkiner Melton
Hick, Pantland
Hilton, Albert
Hitchin, George Robert
Hobbs, Roland Augustus
Hodson, Thomas George Smith
Horton, James Henry
Holmes, Charles James
Holmes, Mathew
Hopkins, Francis Gethin
Horsley, Sir Victor
Howard, Charles Reginald
Huddart, Cuthbert Edmund Arnold
Hudson, Ernest
Hughes, Burroughes Maurice
Hughes, Melville Rule
Hunt, Gladstone Montague
Hunt, Tom Harold
Hunter, Douglas William
Hunter, Howard Tomlin
Hunton, Frederick
Hutton, W—— A——
Hyde, Patrick George

Iles, Charles Cochrane
Impey, Elizabeth Stephens
Inglis, Elsie Maud
Ingram, Thomas Lewis
Ireland, Richard Alfred

Jack, William Boyd
Jamieson, Herbert Mather
Johnson, Frederick Miller
Johnston, Alexander
Jones, Henry John Rutherford
Jones, John Langdale
Jones, Kingsmill Williams
Jones, Raymond
Jones, Thomas William

Keane, Edward Dawson
Kellas, Arthur
Kellie, Kenneth Harrison Alloa
Kelly, Charles Patrick
Keogh, John Ambrose
Ker, Malcolm Albert
Kerr, Eric John
Kilborn, Rowland K——
Kimbell, Henry John Sullings
Kirkland, Hugh Edward
Kirkland, William Duncan
Knaggs, Francis Henry

Lambert, Ernest Charles
Lambert, Francis Courtenay
Latham, Thomas Jones
Lawrence, Henry Ruthven
Lawrie, Edward
Leckie, Malcolm
Leigh, Benjamin Hilton
Leon, John Temple
Levick, Percy
Lewis, Sybil Lonie
Lewitt, Benjamin
Linnell, Robert McCheyne
Linzell, Stanley James
Lister, Arthur Hugh
Lister, C—— R——
Lobb, Francis Frederick
Logan, Alfred Thomas
Logie, Alexander Graham Speirs
Low, Alexander Petrie
Loy, Martin William
Lukis, Sir Charles Pardey
Lukyn-Williams, Herbert Temple
Luther, Guy Fitzmaurice John

New South Wales.

A Practitioner De-registered.

A medical practitioner who had held the appointments of physician to out-patients at the Royal Alexandra Hospital for Children and physician to the Tuberculosis Dispensary, and who had practised in Sydney as a physician for several years, was recently charged before the Medical Board of New South Wales. The charge was that he had made use of his official positions to induce the parents and guardians of the patients to place them under his care as private patients, on the ground that they were suffering from tuberculosis, and that they required special treatment with tuberculin injections, a course of treatment which, he said, they could not obtain at the public hospital. The case was heard before the Board sitting as an open court in accordance with the terms of the Medical Act. The Crown and the defendant were both represented by counsel, and the hearing lasted nine days. The Board subsequently held meetings *in camera*, and it was announced that the charge was held to have been proved, and the name of the practitioner was erased from the Medical Register. The case created a great amount of public interest as the charge had been made in the first instance in the columns of a weekly newspaper.

Royal Prince Alfred Hospital.

The annual report of this institution shows that the past year has been notable for the large amount of work done; in every respect this exceeded the total amount reported for the previous years. The Parliamentary Public Works Committee has recommended the erection of a new venereal block in the lower part of the hospital grounds, at an estimated cost of £36,000. From the statement of receipts and expenditure it appeared that the deficiency (£4,854) was almost exactly the same as in the preceding year; the Board had been able to keep down the expenditure in all directions except in the wages bill, which had increased. The total receipts from donations, subscriptions, and from the auxiliary amounted to £12,660, as compared with £14,192 in the preceding year. Patients' contributions, however, had risen by £3,000, and the income received from the Government had increased from £50,920 to £52,200.

Mr. Oakes, the Minister of Health, said that in his opinion the present system of government, management, and control of public hospitals would have to be considerably altered in the future. The Government were doing something to assist this institution to carry its financial burden, but he hoped in the near future to ask Parliament for £500,000 to put the hospitals of the State, including the Royal Prince Alfred, on a better footing.

Public Health.

At a meeting of the Health Society, Dr. Harvey Sutton, Chief Medical Officer to the Department of Education, spoke of the lack of interest in the cause of the public health. Great Britain, in spite of the huge war debt, had increased the health vote sixfold, but in Australia practically the same amount was allotted as before the war. To preserve health was far more important than to cure disease, and to do this, education, co-operation, and economy were requisite. Efforts were being made in the public schools to teach children hygiene and physical culture. Dr. Sutton also referred to the fact which had been proved by statistics that 10 per cent. of the children of the State died before they reached the age of 5 years. Some means must be taken to prevent this waste of life. At present Australia was far behind Great Britain so far as health legislation was concerned—"in fact we were among the most backward people of the Empire."

University of Sydney Medical Society.

On October 18th a luncheon was held in the Union Hall, under the auspices of the Medical Society, in honour of several retiring teachers who had been members of the honorary medical staffs of the Royal Prince Alfred and the Sydney Hospitals. The retiring teachers were Dr. F. Antill Pockley, Dr. G. E. Rennie, Dr. Hamilton Marshall, Dr. F. Hall, and Dr. Maguire. The toast of "Our Guests" was proposed by Dr. B. T. Edye, and Dr. Pockley replied. In the course of his speech he referred to his early days as a

student at Edinburgh, and remarked that he considered that the medical course was then, on account of the shorter period allowed for graduation, more arduous than the course in Sydney to day. Dr. Pockley bade farewell with the remark that he regretted that the Senate should insist upon the enforcement of retirement at the age of sixty. He considered that many a medical man might be of the greatest value as a teacher at this stage of his life.

Control of Maternity Nurses.

In the annual report of the Director-General of Public Health for the year ending June 30th last reference is made to the control of private hospitals, and the desirability of providing for the compulsory notification of puerperal fever is urged. It is stated that the average number of mothers dying annually from causes connected with childbirth is high in Australia as compared with other countries, and that in comparison with the other States of the Commonwealth New South Wales held an unfavourable position. This state of affairs is attributed to the fact that in this State there is no control over practitioners of midwifery: that any woman, however ignorant or untrained, may take up the work of a midwife, assume the title of "nurse," and incur no legal penalty. The report further states that in all probability outside the registered private hospitals very few of the maternity nurses practising in the country districts have had sufficient training to do justice to the heavy responsibilities they assume, and that even in the metropolis there are far too many untrained maternity nurses in practice.

Lunacy Legislation.

In response to a public demand for some inquiry into the present lunacy laws of New South Wales, and the administration of them, a select committee was appointed by the Legislative Council to make inquiries. The first witness examined was Dr. Eric Sinclair, the Inspector-General of the Insane, who was asked to describe the present method of admitting and discharging patients and the methods of treatment; what defect there might be in the foregoing methods; and what improvements he could suggest in regard to existing conditions and accommodation. Dr. Sinclair stated that the method of admission adopted here was practically that in force in all English-speaking countries; reactionary methods had been suggested, but the movement of modern thought had been in the direction of making admission to mental hospitals easier, rather than more difficult, so that the mental institution should be used for curative treatment rather than merely for detention only. In reply to a suggestion that there was in the public mind a suspicion that a person might be detained in a mental hospital as a result of collusion on the part of relations or others, Dr. Sinclair stated that there was no place in the mental hospitals for a person whose mind was not affected, that the relations of a patient could at any time obtain permission for a re-examination, and that the friends of a patient might petition a judge of the supreme court for a re-examination. The committee then adjourned, and it was subsequently stated that the Chief Secretary had decided to convert the present select committee into a Royal Commission. The actual composition of the Commission has not yet been decided upon, but there are to be representatives from both Houses of Parliament on it. The chairman has not yet been appointed.

Ireland.

Medical Appointments in Ulster.

At a meeting of the Ulster Medical Society on January 4th Dr. John Campbell, M.P., read the report of a committee, appointed by the Society on December 15th, 1922, which had agreed to submit the following resolutions, to be laid before the Ministries of Home Affairs and of Finance of Northern Ireland:

1. That the two medical inspectors under the Ministry of Home Affairs should have salaries of £800 per annum, rising to £1,000.
2. That the Registrar-General should be a member of the medical profession, so that the notification of infectious diseases, the statistics of infantile mortality, the morbidity rates in disease, and the influence of occupation and environment upon the nature and incidence of disease, should receive the attention which only a medical man could properly give.
3. That salaries which were being paid to the medical officers in some of the unions in Northern Ireland were still very low, and the Ministry of Home Affairs should be requested to place the salaries of the medical officers in the various unions throughout Northern Ireland on a more uniform and equitable basis.
4. That the actual work of school inspection should be carried out only by full-time medical officers.

The committee recommended that a permanent Medico-Political Committee should consist of: (1) the Council of the Ulster Medical Society; (2) the Council of the Ulster Branch of the British Medical Association; (3) two members from each local medical committee in the six counties of Northern Ireland; (4) one member from the medical faculty of Queen's University, Belfast; (5) one representative from each Branch of the Irish Medical Association in the six counties.

India.

Leprosy in India.

The notable advances in the treatment of leprosy have given a great impulse to the campaign against that disease in India. An amendment to the Lepers Act now empowers the provincial governments compulsorily to segregate pauper lepers within their borders. Segregation, however, is hardly practicable, if it be true that the total leper population of India may be estimated, as the *Pioneer Mail* asserts, at from half a million to a million. A much more conservative estimate, that of the Census of 1911, puts the number of lepers in the Indian Empire at 109,094, but the officers of the Mission to Lepers consider this to be under the real number, which, in their opinion, is at least 150,000. In Madras, Bombay, and Bengal schemes for the provision of leper settlements are being considered by the provincial governments, while the governments of the Punjab and the Central Provinces are taking more definite action. Over 6,000 lepers are in the institutions controlled or aided by the Mission to Lepers, and another 2,000 are helped by the Mission in other ways. In Behar and Orissa, for instance, there are eight leper asylums in which there were, last year, 1,967 resident patients; the asylums are supported partly by the Government, partly by local authorities, and partly by the Mission to Lepers. The number of lepers in institutions is increasing, but this is considered to be due to the fact that lepers are now going to them more willingly for treatment.

Chemical Examinations in the Punjab.

Lieut.-Colonel J. A. Black, I.M.S., has written a pamphlet dealing in an interesting way with the work of the chemical examination department in the Punjab.[1] In contrast with Bengal, Bombay, and Burma, where the greater part of the chemical examiners' work is done on behalf of the Customs and Excise Departments, in the Punjab medico-legal investigations have always formed by far the larger proportion. In criminal proceedings the position of the chemical examiner is peculiar, for in the great majority of cases he is unable to attend personally (owing to the great distances), and his written evidence, upon which he cannot be cross-examined by the defence, must be accepted. He is compelled, therefore, to adhere strictly to a categorical statement of the results of his analysis, without expressing any opinion, and, as a result, any conflict of medical evidence is avoided. Lieut.-Colonel Black says that, while the incidence of crime, and particularly of poisoning, is far greater in India than in England, the general belief that poisoning in the East is a highly subtle art in which secret poisons defying detection are employed is without foundation. The would-be poisoner in India has recourse to the crude drugs obtainable from the bazaars or to the poisons growing at his door, poisons well known and used from time immemorial. Nor is any subtlety shown in the amount of poison administered, the work of the analyst being simplified by the fact that the amount usually given is far in excess of that necessary for the poisoner's purpose. In addition to the medico-legal side of his work, the chemical examiner analyses water and foodstuffs for local authorities and government departments, medicines and drugs for civil surgeons and others, and performs miscellaneous examinations of various kinds. The new Government laboratory at Lahore, where this work is

[1] *The Work of the Chemical Examiner's Department in the Punjab.* By J. A. Black, Lieut.-Colonel I.M.S. Lahore: Civil and Military Gazette Press. 1921.

carried out, was recently built and equipped at a cost of about one and a half lakhs of rupees, and is stated to be one of the finest laboratories in India.

EDUCATION FOR MEDICAL WOMEN IN INDIA.

It has been decided to establish separate institutions for the training of women medical practitioners in India, and accordingly it is proposed to rent suitable premises opposite the Gosha Hospital, Madras, for the establishment of a women's medical school in that city. The Government has been asked by the Minister of Education to grant an additional sum of Rs. 58,500 for this purpose. At the same time the Minister made the statement that, in 1920, the total number of qualified women medical practitioners in India was only 135 for a female population of more than 21 millions. It is hoped to have the new school ready for occupation July 1st.

Correspondence.

NEW REGULATIONS FOR THE D.P.H.

SIR,—There are certain considerations arising from the new regulations of the General Medical Council for the D.P.H. which seem hardly to have been thoroughly understood by those who are chiefly affected, and which appear to me to deserve discussion.

The Council's new rules will apply after January 1st, 1924. They require that not less than two years shall elapse after obtaining a registrable qualification before admission to the final examination for a Public Health Diploma. The curriculum for the D.P.H. shall extend over not less than twelve calendar months. Six months' practical training under a medical officer of health is an important feature of the new scheme, and the time cannot be reduced by attendance at lectures or by a resident appointment at a fever hospital, as at present. The instruction is to include maternity and child welfare, venereal disease and tuberculosis, food, meat, and milk inspection, etc., all of them more particularly from the administrative standpoint. The examination will consist of two parts, Part 1 covering bacteriology, parasitology, chemistry, physics, meteorology, and climatology; Part 2 includes hygiene and sanitation, epidemiology and infectious diseases, sanitary laws and vital statistics, and public health administration.

At present a candidate may, if he satisfies the necessary tests, obtain a Diploma in Public Health within nine months of his name appearing on the *Medical Register*. It is proposed by the new regulations that this be no longer possible and that at least two years must elapse between the two events. It is obvious, however, that a graduate must give up his whole time to the new D.P.H. course, and although twelve months is the minimum for the actual curriculum it will be by no means the maximum period for this.

It appears to me from reading the new regulations that any medical man who is ever in future to obtain a qualification in public health must obtain it in the period immediately succeeding his qualifying in medicine; in other words, he must make up his mind while still a medical student that he intends to make his career in public health. No longer will the general practitioner be able to work for his D.P.H. while actually engaged in general practice, as is often done nowadays by those within reach of the necessary facilities. What is to be the result? Is the part-time medical officer of health, who does such valuable public work in the small towns and rural districts, to be encouraged to hold his appointment without any special public health qualification? Or is he to be abolished and his duties merged in those of the full-time assistant medical officers of health for the county in which his area is situated?

At the present time there are in Great Britain rather under 1,000 full-time medical officers of health (and assistant medical officers of health), while there are over 1,200 general practitioners who hold part-time appointments as public health officers. Detailed statistics for the whole country are not available at the moment, but the following details for Wales for 1921–22 are interesting upon this point, and show the present tendency:

Of the thirteen county medical officers of health (each of whom possesses the Diploma in Public Health) twelve are also school medical officers. Only one officer gives his whole time solely to the duties of county medical officer of health. The remaining twelve are also full-time officers, but in addition to school medical work they act in other capacities—for example, as medical officers for maternity and child welfare, for venereal diseases work, or under the Mental Deficiency Act, 1913.

In the county boroughs, municipal boroughs, urban and rural districts, 141 officers (21 of whom devote the whole of their time to the office of medical officer of health, or to that office and other duties of a similar nature) were in office at March 31st, 1922, 120 being also in private practice. Twenty-nine of these officers performed the duties of medical officer of health for more than one sanitary district. Each of three rural districts has two part-time medical officers of health. Thirty-three of these 141 medical officers of health possess a Diploma in Public Health in addition to the other statutory qualifications.

During the year there were two instances in which full-time service was substituted for part-time service.

My suggested remedy is that there should be two distinct grades of special qualifications in public health: one that should be held, as a rule, by the general practitioner who wishes to hold a part-time appointment (on the lines of the present D.P.H. regulations), and another, on a higher standard, which should approximate, not to the 1924 regulations for the D.P.H. of the General Medical Council, but to an even higher standard—similar to that of the B.Sc. in Public Health which is granted by certain universities. At Edinburgh University, merely to take an example, candidates for the degree of B.Sc. in Public Health cannot sit for the second (final) examination sooner than eighteen months after having taken their degree in medicine, nor sooner than six months after having passed the first examination for B.Sc. (public health). The curriculum necessary to take this degree ensures that a candidate must give up practically his whole time during eighteen months to working for the degree of B.Sc. in Public Health. For the present Diploma in Public Health of Edinburgh, on the other hand, the course of study extends over nine months; the curriculum is a comparatively full one, but it is certainly not necessary that a candidate should give up his whole time to the work, and it has frequently been obtained by general practitioners.

From the national point of view it appears to me better by far that the general practitioner should be encouraged to take an extra qualification in such a direction as public health, and hold the part-time post of M.O.H. in suitable localities, than that the public health should become more and more an affair of purely bureaucratic control.—I am, etc.,

Willesden, Jan. 11th. W. PATERSON, M.B., Ch.B.

HOSPITAL POLICY.

SIR,—The question of the payment of the staffs of voluntary hospitals has been under discussion since December, 1920, and the formation of staff funds has been the approved policy of the Association since the Annual Meeting of 1921. It is not unreasonable therefore to suppose that in those areas in which the hospital staffs are really anxious to be paid some steps will have been taken to establish staff funds. At the Annual Meeting of 1922 the following resolution was carried unanimously:

> "That when the Report on Hospital Policy comes before the Divisions for further consideration, statistics should be supplied showing the number of hospitals in which a staff fund has been established."

I would appeal to the Divisions and Branches of the Association to withhold their final decision on the question of payment of hospital staffs until they are in possession of this information. With all the available facts before them they will then have to decide whether it is possible or even desirable at the present time for the Association to legislate comprehensively on the subject.

If it is considered necessary to legislate for every kind of hospital patient it is to be hoped that the amendment of Paragraph 32 proposed by the Council (SUPPLEMENT, November 18th, 1922) is not the last word of the Association on the subject; the further amendment proposed by Dr. Rowland Fothergill in his letter published December 30th deserves careful consideration. The proposal to establish "token" payments is open to three serious objections—namely, (1) The average layman cannot understand the peculiar psychology of an "honorary" staff which demands "token" payments. (2) There are many honorary members of hospital staffs who have not the least intention of attempting to establish any such system, be the "hospital policy" what it may. (3) In the event of the State obtaining control of hospitals at some future date "token payments" would be a far worse handicap to the profession in the struggle for adequate remuneration than were the old "club fees" in the Insurance Act fight.

It is conceivable that Paragraph 33 of the existing hospital policy (BRITISH MEDICAL JOURNAL, SUPPLEMENT, October 7th, 1922) really meets all present requirements, and the much amended Paragraph 32 might safely be "scrapped." The Association would then be in possession of a policy capable of expansion in the light of future experience, and having the advantage at the moment of being comprehensible to the average layman and acceptable to the whole profession.—I am, etc.,

Bury St. Edmund's, Jan. 14th. BERNARD E. A. BATT.

SIR,—For centuries mathematicians carried on an active controversy in the endeavour to solve the problem of squaring the circle; we bid fair to do the same in the attempt to find a formula that will allow hospital staffs to receive payment for their work and retain the title of honorary. In the narrowest meaning of the term it is probably not possible to find a solution, but payment in one form or another, generally under the name of an honorarium, has long been allowed—in many instances it has been an actual legal payment, certainly not intended to be a full discharge of the hospital debt, merely an acknowledgement, and it is generally agreed that, so long as a staff provide gratuitous advice and treatment for any fraction of their patients, so long may they, to use Dr. Hawthorne's words, "retain their honorary status"; so far, the proposal of the Hospitals Committee is a rational, if not a strictly logical, solution. The Committee's distinction between the classes from whose payments contribution to the staff fund is and is not to be asked is definite: on the one hand are those who directly or indirectly make some payment for services received, on the other those who neither directly nor indirectly make any contribution to the hospital's funds.

If we depart from this definition and attempt to separate those who in any way contribute, we can only do so by drawing quite an arbitrary line. Why should those who contribute anything from one shilling to twenty be exempt, but not those who pay a shilling more than the twenty (I am taking twenty as an average sum for maintenance)? and if the latter are to be assessed, is it to be only the amount in excess of that required for maintenance or the whole sum that is to be drawn on for the staff funds?

There is fairly general agreement that a percentage of the funds derived from a contributory scheme should be paid to the staff fund, but these schemes are largely made up of quite small individual payments. What does it matter whether the individual pays directly to the hospital or indirectly through such a scheme?

The multiplication of classes of patients is becoming such that bookkeeping would be practically impossible; the proposal to divide into two classes—those who pay something and those who pay nothing—is so much simpler as well as more logical that I hope the policy of the Committee will be maintained. Opposition to any innovation there must be, but the more logical and definite the proposal the easier it is to defend and to get accepted.—I am, etc.,

Bradford-on-Avon, Jan. 14th. CHAS. E. S. FLEMMING.

SIR,—I welcome the return of Dr. Hawthorne to this controversy, and prefer his resolution to Dr. Fothergill's, though I would accept either. It must now be obvious that the policy of the Council, which grew steadily more unpopular the better it was understood, has not been improved by mere application of a specious title to a fund the amount of which was no more determined before than it is now. An offering that is tainted at the source is not less repugnant because it is also mean. The plain fact is that the conception of an "honorary" staff whose services shall be unpaid only to those from whom it is found impossible to squeeze a penny, and who would levy toll on money contributed for the bare necessaries of life, does not attract. In our private practice we do not do these things, and we desire no lower standard of ethics in our hospital work. Since it is inconceivable that proposals which their own promoters are still, after two years, ashamed to present to their own boards will be approved once this fact is realized, and despite repeated challenges it has not been denied, I will now endeavour to meet the objections which have been from time to time raised to that policy I would promote.

There are places, such as Leicester, where well paid workmen exploit the hospital, refuse almoners, and have paid representatives on the board. Here the staff are entirely justified in assuming that such beneficiaries, even if they do not otherwise come into the "tariff" group, can pay more than about 30s. weekly, and therefore should be assessed in this class under our scheme. The full Leicester policy would, therefore, still survive in such places, and only there. In other towns, for example Bristol, doubts are entertained about the financial position of young consultants on the staff. Here if the "staff fund" under our scheme should prove inadequate, which has not yet been demonstrated, two courses are open—either to increase the staff, so as to allow more leisure to each for private practice, or to straightforwardly approach the board, state the position, and leave it to those whose business it is to control finance to raise the necessary funds. On the other hand, in a very large number of provincial and all cottage hospitals the juniors on the staff, being in general practice, not only require no such additional emolument, but mostly decline absolutely to beg money from the source suggested by the Council. Again there are hospitals largely supported by workmen's contributions. In these it will, I believe, be almost always the case that there is some definite financial arrangement between contributors and the board. Under my scheme such beneficiaries are assessed, and therefore the policy of the Council presents no advantage. As for manipulation of contributions, although approved societies have been paying for hospital in-patients for two years, and although the sum now allotted by them for such purpose amounts to £175,000 annually, no example of such manipulation can be produced by the Council, the solitary alleged instance being clearly one either of neglect at the hospital or of concealment by the patient. Even such occasional accident might be prevented by more care at the hospital, and an agreement with societies. Not only is there no foundation for the contention of the Council, but the Voluntary Hospital Commission has quite recently sent round a circular complaining that hospitals, even now, are neglecting to avail themselves of the fund freely and unconditionally offered by these societies.

I think I have dealt now with all objections, and commend to the earnest attention of all who would preserve our voluntary system and avoid a disastrous conflict with the laity the resolution of Dr. Hawthorne or of Dr. Fothergill, supplemented by my own amendments to Section VI, Paragraph 19, in confidence that these or others similar will be passed by a sufficient majority at the Annual Meeting at Portsmouth, and the unity of our profession be preserved.—I am, etc.,

Chichester, Jan. 13th. G. C. GARRATT.

WOMEN DOCTORS.

SIR,—Such is the headline of a recent review in the JOURNAL, written by you probably with some distaste, in defect of an alternative; for it is not an elegant title. But the vulgar "Lady Doctor" is still worse, even intolerable. Some while ago I read in another journal a proposal that medical women should follow princesses, countesses, abbesses, actresses and conductresses, and call themselves, as with our allies the Italians, doctresses. Why not? Why make a single and inconvenient exception to a general rule? Signora Montessori has the becoming title of "Doctoressa." The difficulty does not arise in France and Germany because of the general affix of Madame, or Frau.

The present indifference of title gives rise to confusion as well as to inelegance. A certain committee had gone far towards the election of a young woman—a "Dr. Wilson," let us say—as house-surgeon in a hospital where the resident staff occupied adjoining bedrooms. And often one finds oneself Dear Sirring a feminine correspondent. For women, unlike men, rarely write a Christian name in full—as, for instance, John P. Robinson—but are content with initials. We used to hear, by the way, of Dr. Euphemia Jones and Dr. Vanessa Smith, but this aid has now disappeared. Indeed some Christian names are indeterminate of sex. Perhaps while the doctorate is a new toy our feminine colleagues are not indisposed to a little camouflage, and to masquerade in names as in cigarettes. But as the novelty of "Doctor" wears off will it not be possible to follow the duchesses, and, instead of "Lady Doctor" or its like, to adopt the prettier name of Doctress?—I am, etc.,

January 11th. GRAMMATISTA.

TESTICULAR GRAFTS.

SIR,—In the autumn of last year I read that Docteur Voronoff had been refused a hearing at a Parisian Medical Society on the ground (which was false) that he had already communicated the substance of his paper to the lay press. Several weeks later I heard that the Surgical Section of the Royal Society of Medicine had negatived the proposal that Docteur Voronoff should be invited to come over to England and explain his theories and practice. I therefore determined to go to Paris and investigate matters for myself, saying that there must surely be something of unusual value in the work of a man who was thus being held in the background. I thought of Harvey and Lister. So, just before Christmas, I went. I was fortunate, for on the morrow of my arrival Docteur Voronoff operated on a human patient, into whose tunica vaginalis he anchored portions of the testicle of a chimpanzee, and on the following day he was sufficiently at liberty to spend a considerable time in showing me over his laboratory, explaining his experimental work and displaying his results.

To begin with, a word about the man. Sergius Voronoff, like Metchnikoff, is a Parisianized Russian. He is between 40 and 50 years of age, tall, lean, dark, with the gentle manners of his race. His wife, who recently died, was an American lady with a very large fortune. He holds the position of Director of Experimental Surgery at the Collège de France, a high-browed institution whose officials, being pure scientists, are not allowed to practise for profit. It is thus obvious that the main charge levelled against him—namely, that he is a species of charlatan who is out to exploit the dead or dying sexuality of the senile—is as baseless as it is base. His work is not only unremunerative, it is very costly, and the whole cost of this work is defrayed out of his own pocket.

Many years ago Lorand put forward the theory that senescence was due to the dwindling activities of the thyroid gland. Experiments performed on animals convinced Voronoff that, although there was some truth in this view, it represented less than the whole truth. He therefore turned his attention to the only other endocrine which was as accessible as the thyroid to experimental research—namely, the male gonad. By a series of experiments on animals he showed that senescence can be delayed and senility rejuvenated by grafting young testicles into old animals. He also showed that a male animal castrated before maturity, which consequently failed to develop the secondary male characteristics, could be made to develop these characteristics by testicular grafting. Moreover, it became evident that such animals rapidly acquired the power of copulation, though not, of course, of reproduction. Into one normal young male goat he grafted an additional testicle, a third, with surprising results. The animal's horns grew to twice the length of the normal; so did its hair, especially its beard. It rapidly gave evidence of being grossly oversexed and became so combative and *méchant* that it had to be killed. The head and skin have been preserved, to convince the incredulous. Having thus satisfied himself by over 150 experiments of the potency of the gonadal hormone in rejuvenating old animals, masculating neuters, and overmasculating normal males, Voronoff decided to turn his attention to human beings, in order to see whether in them the hormone acted in the same way as it did in the lower animals. Into this part of the story I do not at present propose to enter. It is a fascinating story which ought to be, indeed must be, and shall be, told by Voronoff himself. There are, however, two points in connexion therewith which may suitably be emphasized here. The one is that the only animals possessing a gonad which is capable of being grafted into human beings are the anthropoid apes, preferably the chimpanzee. Chimpanzees are expensive; they cost from £100 to £150, and in all cases so far operated upon by Voronoff the expense has been borne entirely by him. The second point is that in his operations on the human invalid Voronoff's aim has never been that of restoring the mere sexual capacity. His object has been the rejuvenescence of the mental and muscular vigour, and the case to which he points with the greatest satisfaction is that of a man, an author, prematurely senile, to whom he has restored all his powers save only on the *côté génésique*. It is the facile fashion among certain ignorant people in this country to speak of the French as though they see only and think only of the sexual element in any and every subject. My purpose in writing the above has been to do something to dissipate this infantile and insular attitude, and to bring into its right perspective the really fine work of a wholly disinterested scientist who has conscientiously and generously laboured to increase our knowledge in a department of medicine which is of enormous and ever-growing importance. —I am, etc.,

London, W., Jan. 15th. LEONARD WILLIAMS, M.D.

*** A review of a monograph by Dr. Voronoff, giving a detailed account of his theories and methods, was published in the BRITISH MEDICAL JOURNAL of October 21st, 1922 (p. 763).

OPERATIVE TREATMENT OF FRACTURES.

SIR,—While quite appreciating several of Mr. Charles Firth's points in his interesting letter in your issue of January 6th (p. 43), I would like to say that I purposely made very slight reference to *plating*, or to the details of the *plating* procedure. Nor did I discuss the many different views as to the most suitable type of plates and screws. Probably enough has been written already on that subject. Lane's work, of course, still stands—as I think—unchallenged.

I did emphasize, however, the unsuitability of ordinary silver wire for the usual wiring procedures, and recorded in my paper how we had been led to seek for a material which would justify a larger application of the procedure of wiring. This material we found in the brass wire I referred to, and I can only repeat here what I said in my paper—namely, that we have found it reliable, capable of standing any of the ordinary strains, and pliable to work with. We do not find that it is acted on by the tissues to an extent that can matter.

Per contra, I think I may doubt the statement of Mr. Firth that the iron wire he suggests is "not acted on by any of the tissues." We have found steel pins much eaten away even in the space of a very few weeks. Iron must surely oxidize in the tissues.

In any case, the matter can be submitted very easily, and very simply, to the test, either of ordinary experience or of experimental investigation. I am quite open to try some of the wire Mr. Firth suggests if he will be good enough to send me some or to indicate where it may be procured. I beg to thank him for his interesting note.—I am, etc.,

Glasgow, Jan. 10th. ARCHIBALD YOUNG.

"ANGELS AND MINISTERS."

SIR,—I welcome the companionship of your leader if it be only for some of the way. We shall have a friendly journey up to this statement: "But entry into the House of Commons turns so largely upon the play of party politics, and the changes and chances of political life are so great, that when a Government has to be formed, a medical statesman of the first magnitude may not be at hand. Such a man may be amongst us to-day; yet when he went out of office it might be said with truth: 'Here was a Caesar! when comes such another?'" But unless the cheerful vigour so generously attributed to me can succeed in dissipating such fears and in making it plain that men of the medical profession are not less versatile than men in other professions, we part company at this "conclusion of the whole matter"—namely, at the doubt expressed whether the medical profession would be able to produce a continuity of medical statesmen of the first magnitude. My answer is that it can, otherwise our great profession is unworthy of its high calling and is in a parlous state indeed.

In casting doubts upon this crucial point your leader is leading the members of the Association and the general public to understand that the medical profession is so limited in resource that it cannot produce men capable of administering affairs which, under proper revision, would be essentially within its own province. Such an admission appears to me to be hopeless, derogatory, and entirely untrue, and never before has the intelligence of a responsible body of men been so grievously assaulted.

Why should your leading article fear that men taken from our own profession should fail, and yet give everyone the impression that no such anxiety is felt about the capability of men taken from other professions? Instead of fighting a fallacy this is to foster one that has prevailed too long.

Does your article desire to attribute to Sir Alfred Mond and Sir Arthur Griffith-Boscawen imperial powers of administrative intelligence denied to medical men? The article concludes with a quotation about Caesar; I will conclude with another which may be as apt and gives expression to my point: "Render unto Caesar the things that are Caesar's." —I am, etc.,

London, W., Jan. 16th. G. LENTHAL CHEATLE.

VITAMIN CONTENT OF CERTAIN PROPRIETARY PREPARATIONS.

SIR,—The article in your issue of January 6th on the vitamin content of certain proprietary preparations is so apt to produce a misleading impression in the minds of medical men who prescribe virol for their patients that I trust you will allow me space for a brief reply thereto.

The gist of the paper lies in the demonstration that "in none of the cases examined have the manufacturers succeeded in concentrating vitamins on a commercial scale."

As regards virol, nothing of the sort has been attempted and no such claim has ever been made. Vitamins are but one of the factors in diet; the equally important criteria of balance and digestibility have been considered in its composition.

The value of virol in regard to vitamins lies in the fact that it supplies them in a form suitable for infants and invalids, for whom a diet of "milk, butter, green vegetables, and fruit" would hardly be suitable. As regards milk, it will be noted that the addition of the daily adult dose of virol enables the quantity of the milk (where this is the only food) to be diminished by 17 ounces. This is of value in the numerous cases where it is desirable or essential to reduce the bulk of the fluid intake as far as possible, and constitutes a strong argument for its employment under these conditions.

Comparison is also made with cod-liver oil. It has never been contended that virol consists solely of vitamin-containing fat, and it is thought better to supply a smaller but still adequate proportion of vitamin A in a palatable and digestible form; the formula of virol has received clinical endorsement by the fact that it is used in more than 3,000 hospital and infant clinics. From the vitamin A content in the table the cod-liver oil used was presumably the crude oil, which, though doubtless palatable to a rat, would certainly be rejected by many children and invalids. If, however, it be replaced by some of the "refined" or tasteless substitutes, the prescriber is entirely ignorant of the vitamin content thereof. It is common knowledge, for instance, that "cod-liver oil" is often adulterated with cotton-seed oil, which contains no vitamin A whatever. Moreover, many patients are unable to digest cod-liver oil in any form whatever. In virol, on the other hand, the vitamin-containing fat is presented in a palatable and digestible form.

While welcoming the independent confirmation of the presence of vitamins A and B, we are anxious that it should not appear that we have claimed to supply these in a concentrated form. Virol is a food for use in certain conditions where ordinary diet is inapplicable, and is in no sense a drug.—I am, etc.,

ARTHUR E. CANNEY,
Managing Director, Virol Limited.

London, W., Jan. 8th.

Obituary.

ELLIS T. DAVIES, M.D., F.R.C.S.EDIN., Liverpool.

WE regret to announce the death of Dr. Ellis Thomas Davies, which took place at his residence in Liverpool on January 5th. During the past six years he had been suffering from bronchitis and emphysema, which restricted his medical work to a great extent, although he still saw many of his old patients down to a period shortly before his death. He was born at Caerwys, in Flintshire, in 1856, and after a sound general education became a student at Edinburgh. He graduated M.B., C.M. in 1877, and M.D. in 1884, and in 1894 he became by examination F.R.C.S.Edin., having previously, in 1893, obtained the diplomas of M.R.C.S., L.R.C.P. Settling down into private practice, he devoted special attention to obstetrics and gynaecology, and was attached to the Ladies' Lying-in Charity, the Liverpool Hospital for Women, and to the Samaritan Hospital for Women, where he held the post of honorary surgeon for some years. He was an active member of the North of England Obstetric and Gynaecological Society, and held the post of vice-president. Dr. Davies published many papers in the *Liverpool Medico-Chirurgical Journal* on diseases of women. These were without exception excellent records of a keen clinician and skilful surgeon.

Dr. Davies was for many years an active member of the Executive Committee of the Lancashire and Cheshire Branch of the British Medical Association; he had held the offices of vice-president of the Branch and chairman of the Liverpool (Northern) Division. As a member of the Medical Institution he rarely missed its meetings and frequently spoke on subjects of gynaecological interest. A fearless critic, Dr. Davies did not hesitate to express his opinion on modern surgical methods, and on the results of the surgical treatment of cancer. He took much interest in the public life of the city and for some years occupied a seat on the board of the West Derby Guardians. In this capacity he brought to bear his vigorous criticism upon the needs of the sick poor. Dr. Davies was a man of vigorous action and earned the esteem of all those with whom he was brought into contact. He was a kind man, and many good actions he performed by stealth; the soul of honour, devoid of intrigue, he endeared himself to his patients and professional brethren, and his death has come as a sore blow to all his friends. When in committee meetings he may have failed to carry conviction, no rancour was left behind. The funeral took place on January 8th, and many personal friends and representatives of the institutions with which he was associated were present to honour his memory. He was unmarried, and leaves behind a brother, Dr. J. Twiston Davies, who is in practice in Wallasey.

Dr. WILLIAM CARMICHAEL STEEN died at Letchworth, Herts, on January 4th, in his 60th year. He was the eldest son of the late Dr. Robert Steen of the Royal Belfast Academical Institution. He graduated M.D. and M.Ch., R.U.I., in 1886, and practised at Owston Ferry, Lincolnshire, and at Belfast. For many years he was laid aside from active work by spinal caries. He bore his long illness with exemplary patience and cheerfulness under such suffering as would have disheartened a less brave man. Among his many occupations must be included the work that he did for the Braille Library for the blind. He not only mastered the difficulties of Braille and transcribed books by this method but was a recognized instructor in the subject. Dr. Steen was a member of the British Medical Association and was keenly interested to the last in the advances of medical science. He married in 1900 Margaret, youngest daughter of the late William Eaden Lilley of Cambridge, who survives him.

Dr. JOHANNES ORTH, Professor of Pathological Anatomy in the University of Berlin, died on January 13th. He was born in 1847, and was assistant first to Rindfleisch in Bonn, and afterwards to Virchow in Berlin. In 1878 he became professor of pathology at Göttingen, and succeeded Virchow at Berlin in 1902. He was a successful teacher, and the author of several textbooks.

Universities and Colleges.

UNIVERSITY OF LIVERPOOL.

THE following candidates have been approved at the examination indicated:

D.P.H.—Christine C. Abernethy, Esther Ashworth, A. E. I. Connolly, C. E. Freeman, A. Speight.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

A QUARTERLY Council Meeting was held on January 11th, when Sir Anthony Bowlby, President, was in the chair.

Diplomas of membership were granted to 3 further candidates recently found qualified. Diplomas in Public Health were granted to 24 candidates. Diplomas in Tropical Medicine were granted to 13 candidates. Diplomas in Psychological Medicine were granted to 13 candidates.

Lectures.

The lecture arrangements at the College for 1923 are as follows: January 29th, Professor R. L. Knaggs: Osteitis fibrosa. January 31st, Professor E. M. Woodman: Malignant diseases of the upper jaw, with special reference to operative technique. February 2nd, Professor C. A. Joll: The metastatic tumours of bone. February 5th, Professor H. E. Griffiths: The relation of diseases of the gall bladder to the secretory function of the stomach and pancreas. February 7th, Professor Geoffrey Keynes: Chronic mastitis. February 9th, Professor L. B. Rawling: Remote effects of gunshot wounds of the head. February 14th, Sir John Bland-Sutton: The Hunterian Oration. February 21st, Mr. R. L. Braithwaite: The flow of lymph from the ileo-caecal angle and its possible bearing on (1) the formation of gastric and duodenal ulcers, and (2) the cause of other types of indigestion. February 23rd, Mr. E. R. Flint: Abnormalities of the hepatic and cystic arteries and bile ducts. The lectures, which are free without ticket, will be given at 5 p.m., with the exception of the Hunterian Oration, which will be delivered at 4 p.m.

LONDON HOSPITAL MEDICAL COLLEGE.

LECTURES on "The mathematical basis of physiological problems" will be given at the London Hospital Medical College by Dr. W. A. M. Smart, at 4.30 p.m. on January 25th, February 1st, 8th, 15th, 22nd, and March 1st and 8th. Attendance at this course is recognized in connexion with the B.Sc. (Honours) Degree in Physiology. Admission is free without ticket.

Medical News.

A CONFERENCE of staffs of voluntary hospitals in London, arranged by the Metropolitan Counties Branch of the British Medical Association, will be held in the Council Room, 429, Strand, on Tuesday, January 30th, at 4 p.m. The business will include discussion of a report on the scheme of the Hospital Saving Association prepared by the Advisory Hospitals Committee; and the reply of the Hospital Saving Association thereon.

WE are informed by the Cremation Society of England (52, New Cavendish Street, W.1) that the total number of cremations in Great Britain during 1922 was 2,009, a net increase of 87 on the figures for the previous year. While in Greater London there was an increase of 123, there were 36 fewer cremations elsewhere, the crematoria at Birmingham and Sheffield alone showing any substantial improvement on the figures for 1921. Compared with the average of the preceding ten years, the figures for 1922 show an increase for Greater London of 36.33 per cent., and for the Provinces an increase of 18 per cent.

SIR ALMROTH WRIGHT, K.B.E., F.R.S., will give the Friday evening discourse before the Royal Institution of Great Britain on January 26th at 9 p.m., his subject being the machinery of antibacterial defence.

A POST-GRADUATE course on crime and punishment has been arranged for medical practitioners by the Faculty of Medicine of the University of Birmingham from May 7th to 19th inclusive. The course will consist of lectures on crime and punishment, mental defect, and insanity, together with demonstrations at the prison, at Barnsley Hall Asylum and at other institutions. The fee for the course will be £5 5s. Further particulars appear in our advertisement pages.

THE Royal Microscopical Society has established a section to deal with the practical use of the microscope in connexion with industrial research. The first meeting will be held on Wednesday next at 20, Hanover Square, when Professor Frederic J. Cheshire, director of the optical engineering department, Imperial College, South Kensington, will take the chair at 7 p.m.

AT the annual general meeting of the Association of Economic Biologists, to be held at the Imperial College of Science on January 26th, at 2.30 p.m., Professor R. T. Leiper, M.D., will give an address on the study of helminthology.

LORD TREDEGAR has given a mansion, Cefr Mably, near St. Mellons, about four miles from Cardiff, to the King Edward VII Welsh National Memorial Association; it is to be converted into a tuberculosis hospital at a cost of £41,000.

THE anniversary meeting of the Royal Anthropological Society will be held at 50, Great Russell Street, W.C.1, on Tuesday, January 23rd, at 8.15 p.m.

THE election to the vacant scholarship of the Grocers' Company for original research in sanitary science will take place in May next. The Company founded three scholarships, each of the value of £300 per annum, with an allowance to meet the cost of apparatus and other expenses; they are tenable for one year, but renewable for a second or third year. Applications must be sent in before April 1st to the Clerk of the Grocers' Company, Grocers' Hall, E.C.2, from whom a form of application and other information can be obtained.

DR. DAWSON TURNER and Mr. D. M. R. Crombie have each been awarded a Makdougall-Brisbane medal by the Royal Scottish Society of Arts for their paper on "An investigation of the ionized atmosphere around flames by means of an electrified pith ball."

A POST-GRADUATE course will be conducted in the ophthalmic clinic of the Hôtel Dieu, Paris, by Professor F. de Lapersonne, assisted by Dr. Terrien, Dr. Hautant, and others, commencing on Thursday, May 3rd, and extending over May and June. A special certificate from the Paris Faculty of Medicine will be given at the end of the course. The fee is 150 francs, and further information may be obtained from the Secretary of the Faculty of Medicine, Paris.

THE British Association for the Advancement of Science will meet this year in Liverpool from September 12th to 19th, under the presidency of Sir Ernest Rutherford. The presidents of the thirteen Sections include Professor G. H. Nuttall, M.D. (Physiology), Professor F. G. Donnan (Chemistry), Mr. P. E. Newberry (Anthropology), and Mr. C. Burt (Psychology).

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Attiology, Westrand, London*; telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London*; telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Mediseera, Westrand, London*; telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone, 4361, Central).

QUERIES AND ANSWERS.

INCOME TAX.

"B. H." enquires whether certain items are admissible expenses in respect of a medical superintendent of an infirmary under a board of guardians.

*** Renewal of medical books, £4 8s. 9d.; professional society subscriptions, £7 7s.; medical journals, £2 2s. We regard these payments as incurred in order to maintain the professional competence of the officer, and therefore analogous to the expense of keeping a car or motor-cycle in a satisfactory state of repair; on these grounds we consider, and have always held, that these expenses should be allowed.

Accountant's fee for completing income tax return, £3 3s. The emoluments of an office are assessable under Schedule E, and the rule is that expenses to be allowable should be incurred wholly, exclusively, and necessarily in the performance of the duties of the office; in our opinion a claim for the allowance of this expense would not be well founded.

LETTERS, NOTES, ETC.

INTERNAL USE OF LIQUID PARAFFIN.

DR. JOHN BROWN (Blackpool) writes that for several years he has given up prescribing liquid paraffin as a laxative, and that Dr. Dixon's opinions (December 30th, 1922, p. 1280) are worthy of serious consideration. I have no facts (Dr. Brown continues) to prove that liquid paraffin is a serious factor in the causation of cancer. It is open to question whether it is a safe laxative for regular use in cases of habitual constipation. Personally, I think it is not. We have reliable and safe aperients in the natural aperient waters, which clear the alimentary canal and leave the mucous membrane clean and fit to carry on its many natural functions. Liquid paraffin coats the mucous membrane with a greasy, non-absorbable surface, and I consider this a serious objection to its use. I am opposed (he adds) to use of the very many coal-tar products if natural drugs can be used.

VACANCIES.

THE Ministry of Labour for Northern Ireland is about to appoint, for the purposes of the Workmen's Compensation Act, 1906, two medical referees for the county and city of Londonderry, one for the county of Tyrone, and one for Belfast and the county of Antrim. Applications should be made to the Secretary of the Ministry, 7, Upper Queen Street, Belfast, not later than January 31st.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals will be found at pages 32, 33, 36, and 37 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 34 and 35.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 19.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£	s.	d.
Six lines and under	0	9	0
Each additional line	0	1	6
Whole single column (three columns to page)	7	10	0
Half single column	3	15	0
Half page	10	0	0
Whole page	20	0	0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive poste *restante* letters addressed either in initials or numbers.

British Medical Journal.

JANUARY 27TH, 1923.

CONTENTS.

ORIGINAL ARTICLES.

An Address on Some Problems of Prostatectomy. By Sir JOHN THOMSON-WALKER, M.B., F.R.C.S.... 133

Surgical Treatment in Cases of Pulmonary Tuberculosis. By H. MORRISON DAVIES, M.D., M.Ch., F.R.C.S..... 138

Damaged Lungs and Bronchiectasis. By CLIVE RIVIERE, M.D., F.R.C.P.... 141

An Unusual Case of Typhoid Spine with Symptoms of Spinal Cord Affection. By Professor H. TURNER, Petrograd..... 142

Treatment by Diathermy. By W. J. TURRELL, M.A., M.D..... 143

The FitzPatrick Lectures on the Post-Hippocratic Schools of Medicine. By R. O. MOON, M.D., F.R.C.P..... 145

MEMORANDA.

Albuminuric Retinitis as a Prognostic Sign. By FRED. TRESILIAN, M.D., F.R.C.P. 148

Atophan Poisoning. By C. WORSTER-DROUGHT, M.D..... 148

REPORTS OF SOCIETIES.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE:
The New Trypanocidal Remedies..... 149

ROYAL SOCIETY OF MEDICINE:
Spheno-occipital Chordoma..... 150
Carcinoma of the Vagina and Cervix. 151

MEDICAL SOCIETY OF LONDON:
X-Ray Treatment of Malignant Disease: Clinical Results..... 152

ROYAL ACADEMY OF MEDICINE IN IRELAND:
Paroxysmal Tachycardia..... 153

ULSTER MEDICAL SOCIETY:
"Lung Splinting"..... 154

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION..... 154

LEADING ARTICLES.

EDWARD JENNER..... 163

THE INFLUENCE OF PASTEUR ON MEDICINE..... 164

THE WEEK.

The Mode of Action of Trypanocides... 165
Small-pox and Vaccination in the Philippines..... 165
Vital Statistics of Prussia Before and After the War 166
The Excretion of Vitamins..... 167
Hygienic Methods of Industrial Painting 167
Vibrating Sensation..... 168
International Air Congress, 1923..... 168
International Physiological Congress... 168
Murders..... 169
Pasteur—the Artist..... 169

GENERAL ARTICLES AND NEWS.

SMALL-POX AND VACCINATION IN THE PHILIPPINES. By John C. McVail, M.D., LL.D., F.R.F.P.S.G..... 158

ANTHRAX CONTROL..... 162

ROYAL MEDICAL BENEVOLENT FUND.... 162

VITAL STATISTICS FOR ENGLAND AND WALES, 1922..... 173

MEDICAL NEWS..... 173

REVIEWS.

Science and Human Affairs..... 154
Psychology and the Parent..... 155
Treatment by Suggestion..... 155
Heredity in Man..... 155
A French Textbook of Neurology..... 156
Therapeutic Novelties..... 156
Dictionary of Applied Chemistry..... 156
The Gold-Headed Cane 157
Notes on Books..... 157

THE SERVICES.

Foreign Decorations..... 172

UNIVERSITIES AND COLLEGES.

University of Oxford..... 173
University of Cambridge..... 173
Victoria University of Manchester..... 173
University of Edinburgh 173
University of St. Andrews..... 173
University of London..... 173

LOCAL NEWS.

ENGLAND AND WALES—
The Haslemere and District Hospital. 169
The New Spirit in Psychiatry..... 169

SCOTLAND—
Scottish Poor Law Medical Officers' Association..... 169
Queen Victoria Jubilee Institute..... 170
Royal Glasgow Asylum for the Blind. 170

IRELAND—
Sweepstakes for Charitable Purposes. 170

CORRESPONDENCE.

Turpentine or Lead Poisoning a Cause of Punctate Basophilia. By F. C. Eve, M.D., F.R.C.P..... 170

The Effect of Anaesthetics on the Lungs. By P. Watson-Williams, M.D. 170

Apituitarism and the Anencephalic Syndrome. By N. B. Capon, M.D..... 171

Adder Bite. By Surgeon Rear-Admiral W. Eames, R.N.(ret.)..... 171

Nystagmus. By J. A. Wilson, M.D..... 171

Vitamin Content of Certain Proprietary Preparations. By Katharine H. Coward, M.Sc., and A. J. Clark, M.C., M.D., F.R.C.P. 171

Dangerous Drugs Regulations..... 171

Cadet Organization and Preventive Medicine. By R. J. E. Hanson, M.B., B.Ch..... 172

OBITUARY.

H. P. Symonds, F.R.C.S.Edin..... 172

LETTERS AND ANSWERS.

Dull Hair..... 174
Treatment of Infantile Paralysis..... 174
Income Tax..... 174
Determination of Sex..... 174

VACANCIES..... 174

(See also page 23 of Supplement.)

The SUPPLEMENT contains:—

CURRENT NOTES:
Insanity and Crime.
Notification of Venereal Diseases.
Surplus Medical Stores.

Association Notices: Table of Dates.

Vacancies and Appointments; Naval and Military Appointments; Diary.

AN EPITOME OF CURRENT MEDICAL LITERATURE will be found at the end of the JOURNAL.

AIX-LES-BAINS
SAVOY FRANCE

For the cure of
RHEUMATIC AFFECTIONS AND GOUT.

For information and pamphlets apply to Office Français de Tourisme, 56, Haymarket, London, S.W. 1.

INDEX TO ADVERTISEMENTS.

Advertisements are classified so far as date of receipt and printing conditions make possible. Advertisements of the following classes will for the most part be found on the pages indicated.

COVER.

PUBLISHERS.

Bailliere, Tindall & Cox.
Thorne, I. T.—NaphelmTreatment i
Vernon, W.—Angina Pectoris i
Wallace, J. S.—Prevent of Dental Caries i
" Dental Diseases in Relation to Public Health i
" Child Welfare i
Worth, C.—Squint i

Cambridge University Press.
Savage, W. G.—Food Poisoning i

Churchill, J. & A.
Medical Directory, 1923 i
Anrep & Harris's Physiology i
Berkeley & Bonney's Obstetric Practice.. i
Bowlby & Andrewes' Surgical Pathology. i
Burns's Biophysics i
Coles, A. C.—Critical Microscopy i
Collis & Greenwood's Industrial Hygiene i
Gask & Wilson's Surgery i
Lee & Gatenby's Microtomy i
Sequeira's Diseases of the Skin i
Taylor & Poulton's Medicine i
Taylor's Medical Jurisprudence i
Tomes, Tims & Henry's Dental Anatomy i

Frowde, H., Hodder & Stoughton
Price, F. W.—Diseases of the Heart i

Lewis, H. K. & Co. Ltd.
Lindsay, J. A.—Medical Axioms, &c..... i
Powell & Hartley—Lungs and Pleuræ ... i

Nisbet & Co.
Paterson, H. J.—Surgery of the Stomach i

Oxford Medical Publications.
Price, F. W.—Practice of Medicine i

Saunders (W. B.) Co., Ltd.
Pediatrics for the Practitioner i

ANÆSTHETICS—
Duncan, Flockhart & Co.—Anæsthetics. iii

CHEMISTS, &c.—
Benger's Food, Ltd.—Liquor Pepticus... ii
Essence of Rennet ii
Newbery & Sons, Ltd.—
"Edme" Malt and Cod Liver Oil ... iii

FOOD PREPARATIONS—
Valentine Meat Juice Co.—Meat Juice .. iv

PUBLISHERS.

Arnold, E. & Co.
Andrews, Barris, Berkeley, & Others—
Diseases of Women 4
Midwifery 4
Cathcart, Paton & Pembrey—Practical Physiology 4
Cowan & Ritchie—Diseases of the Heart 4
Dixon, W. E.—Pharmacology 4
Hutchison, R.—Food and Dietetics 4
McCann, F. J.—Com. Female Ailments.. 4
Vincent, S.—Internal Secretion, &c. 4

Bailliere, Tindall & Cox.
Burrows, H.—Mistakes and Accidents of Surgery 5
Green & Bosanquet's Pathology 5
Hadfield, C. F.—Practical Anæsthetics. 5
Hope, E. W.—Indust. Hygiene & Med... 5
McKenna, R. W.—Diseases of the Skin. 5
Whitla's Materia Medica, Pharmacy, &c. 5

Minerva Co.
Medical & Psychological Publications.... 4

Saunders (W. B.) Co., Ltd.
Abt, I. A.—The Baby's Food 3
Griffith, J. P. C.—Diseases of Infants... 3
Care of the Baby 3
Hill, L. W.—Infant Feeding 3
Kerley, C. G.—Practice of Pediatrics.... 3
Pirquet, C.—System of Nutrition 3

ANÆSTHETICS—
Macfarlan & Co.. Ltd.—Anæsthetics 10

ASSURANCE COMPANIES—
Medical Sickness, Annuity & Life Society 27
Prudential Assurance Company 9

BANKS—
London County and Westminster Bank. 9

BATHS, SPAS, &c.—
Aix-les-Bains 1
Droitwich Brine Baths 32
Val-Mont, Montreux (Switzerland) 32

BOOTMAKERS, &c.—
Scholl Mfg. Co., Ltd.—Foot Appliances.. 22

BRASS NAME PLATES, &c.—
Cooke's Brass Name Plates 28
Herd Bros.—Brass Name Plates 4
Osborne & Co.—Brass Name Plates 25

DISPENSING BOTTLES, &c.—
Jessop, H.—Dispensing Bottles 25

CHEMISTS, &c.—
Allen & Hanburys, Ltd.—Bynin Amara. 19
Angier Chemical Co.—Angier Emulsion.. 18
Armour & Co., Ltd.—Laborat. Products. 14
Astier Laboratories—Riodine 11
Boots Pure Drug Co.—Stabilarsan 15
Bravais Iron Tonic 8
Burroughs, Wellcome & Co.—
Cod Lver Oil with Extract of Malt... 17
"Tabloid" Ammoniated Quinine ... 16
"Tabloid" Quinine Compound 16
Centaur Chemical Co., Ltd.—Ambriodin 8
Christy & Co.—Musterole 10
Colman's D.S.F. Mustard 25
Kerol Ltd.—Kerol Capsules 9
Kolynos Incorp.—Dental Cream 6
Lambert Pharmacal Co.—Listerine 11
Martindale, W.—Parafagar 8
May, Roberts & Co.—Pomade Max 11
Oppenheimer, Son & Co.—Bi-Palatinoids 11
Peat Products Co., Ltd.—Sphagnol 13
Pepsodent Co.—Pepsodent 4
Sandoz Chemical Co., Ltd.—Felamine... 14
Semprolin Co., Ltd.—Semp. Emulsion .. 13
Squire & Sons, Ltd.—Terperoin Preps .. 12

FOOD PREPARATIONS—
Oppenheimer, Son & Co.—Roboleine 8

MATTRESSES, BEDDING, &c.—
Moorhouse & Co., Ltd.—
"Luxelda" & "Woolvo" Mattresses 6

MOTOR CARS, TYRES, &c.—
Credit Corporation, Ltd.—Motor Cars... 22
De Dion Bouton, Ltd.—Motor Cars 21
Gamage, A. W., Ltd.—Motor Cars, &c.... 24
Hillman Motor Car Co.—Motor Cars 24
Offord & Sons, Ltd.—Motor Cars 22
Renault, Ltd.—Renault Cars 12
Rover Co., Ltd.—Motor Cars 22
Secondhand Motors for Sale 16
Wolseley Motors Ltd.—Motor Cars 23
Zenith Co., Ltd.—Carburetter 25

SANITARY APPLIANCES—
Lewbart Manufacturing Co., Ltd.—
The Lewbart Disinfector 7

SURGICAL APPLIANCES—
Acousticon 21
"Aurorascope" Co., Ltd.—Aurorascope... 4
Fundus Attachment 25
Bailey & Sons—Elastic Stockings 25
City Sale & Exchange—Microscopes, &c.. 38
Clarkson's Secondhand Microscopes 22
Domen Belts Co.—Corsets, &c. 28
Grout & Co., Ltd.—Crepe Bandages 4
Hoefftcke, C. A.—
Ambulatory Treatment of Fractures 20
Salt & Son, Ltd.—Gastroptosis Belt 27
Siebe, Gorman & Co.—Douglas Apparatus 25
Surgical Manufacturing Co.—
"Barton" Sphygmomanometer 28

VACCINES & CULTURE MEDIA—
Genatosan, Ltd—Detoxicated Vaccines.. 12
Laboratories of Pathology & Pub. Health 28

X-RAY & ELECTRO-MEDICAL APPARATUS—
Medical Supply Association, Ltd.—
X-Ray & Electro-Medical Apparatus. 26

TAILORING & UNDERCLOTHING—
Burberrys Waterproofs, &c. 22
Douglas Millard & Co.—Tailoring 38
Hall, H.—Medical Service Dress 38
Hamilton & Co.—Overcoats 9
Invisible Repair Co.—Tailoring 22
Jaeger Pure Wool Underwear 9

TYPEWRITERS, PENCILS, &c.—
Newbold, Miss A.—Translations, &c..... 4
Taylor's Typewriter Co., Ltd. 25

HYDROS—
Bournemouth Hydro 28
Smedley's Hydro., Matlock 28

HOMES AND ASYLUMS—
Balmoral House, Buxton 28
Barnwood House, Glos. 29
Beckside, Thornton-le-dale 28
Bishopstone House, Bedford 19
Bootham Park, York 29
Boreatton Park Asylum 29
Brislington House, near Bristol 29
Brompton Hospital for Consumption ... 31
Brunton House, Lancaster 28
Camberwell House, Peckham 30
City of London Mental Hospital 32
Coppice, Nottingham 29
Duff House, Banff, N.B. 19
Fenstanton, Streatham Hill 29
Grove House, All Stretton 28
Haydock Lodge Asylum, Lancashire..... 30
"Hensol," Chorley Wood West 29
Littleton Hall, Brentwood 29
London Fever Hospital 32
Northwoods House, Winterbourne 30
Old Manor, Salisbury 30
Resident Patients 32
Royal National Hosp. for Consumption.. 30
Shaftesbury House, Lancashire 29
Shropshire Orthopædic Hospital 32
Springfield House Asylum, Bedford..... 19
Stour Valley Nursing Home 28
St. Andrew's Hospital, Northampton.... 19
St. Chad's Hospital, Birmingham 28
St. Michael's, Broadstairs 28
Stretton House, Church Stretton 28
The Grange, near Rotherham 28
The Grove, Old Catton 29
Vale of Belvoir Nursing Home 29
Wye House, Buxton 28

INEBRIETY—
Dalrymple House, Rickmansworth..... 29
Essex House, Barnes 29

SANATORIA—
Ashover Sanatorium, Derbyshire..... 31
Frimley Sanatorium 31
Grampian Sanatorium 31
Mendip Hills Sanatorium 31
Palace Sanatorium, Montana-sur-Sierre. 31
The Deeside Sanatoria in Scotland..... 31
Westmorland Sanatorium 32

MEDICAL SCHOOLS, &c.—
Clinical Research Association, Ltd..... 33
Glasgow Post-Graduate Medical Assoc.. 33
Guild of Health—Public Lecture 33
Liverpool School of Tropical Medicine.. 32
London School of Tropical Medicine..... 32
Middlesex Hospital Medical School 33
North-East London Post-Grad. Coll.... 32
St. Mary's Hospital Medical School..... 33
University of Birmingham 34
University of London—University Coll.. 33
W. London Hosp. Post-Graduate College. 32

TUTORS AND LECTURERS—
Chemistry & Physics—H. W. Hill..... 33
Examinations—Med. Corresp. College. .. 32
Stammering—Miss E. Behnke 33
University Exam. Postal Institution.... 32

EDUCATIONAL VACANCIES—
Middlesex Hospital & Medical School... 34
University of Cape Town 34
University of London 34

CONTRACT PRACTICE & OTHER APPOINTMENTS.
IMPORTANT NOTICE—RE APPOINTMENTS 23

SCHOOLS, &c.—
Anstey College, Erdington, Birmingham 33
Marlborough College, Cheshire 32
Rossall School 34
Schools for Boys & Girls—J. & J. Paton. 33
St. Paul's House, St. Leonards-on-Sea .. 32

HOSPITAL, &c., VACANCIES—
IMPORTANT NOTICE—RE APPOINTMENTS 23
Ashburton Urban District 39
Battersea Borough Council 39
Birmingham Maternity Hospital 34
Bolingbroke Hospital, S.W. 39
Bristol General Hospital 34
Bristol Royal Infirmary 39
Cape Town, City of 39
City of London Hosp. for Chest Diseases 34
City of London Mental Hospital 39
Countess of Dufferin's Fund, India 34
Croydon County Borough 34
Croydon General Hospital 34
Denbighshire Infirmary 32
Durham County Hospital 39
Kent and Canterbury Hospital 39
London Lock Hospital 39
Manchester, City of 39
Napsbury Mental Hospital 39
Newcastle Throat and Ear Hospital 39
Norfolk and Norwich Hospital 39
Northampton County Borough 39
North Staffordshire Infirmary 34
Preston Royal Infirmary 39
Prince of Wales Gen. Hosp., Tottenham 34
Rochdale Infirmary & Dispensary 34
Rotherham Hospital 39
Royal Bucks Hospital, Aylesbury 39
Royal Eye Hospital, Southwark 39
Royal Liverpool Children's Hospital..... 39
Royal London Ophthalmic Hospital..... 39
Royal Southern Hospital, Liverpool 39
Salford Royal Hospital 34
Southend Victoria Hospital 39
South London Hospital for Women..... 39
University College Hospital 38
Victoria Hospital for Children, Chelsea. 34
Western Ophthalmic Hospital 38
Weston-super-Mare Hospital 34
Worcester County and City Hospital.... 39

ASSISTANTS, PRACTICES, &c.—
Assistancies Wanted and Vacant 36
Dispensers, etc. 36
Practices Wanted and for Disposal 36,37

NURSING INSTITUTES—
Cavendish Temperance Nurses Corporat. 39
Male Nurses (Temperance) Co-operation.. 40
Queen Alexandra's Military Nurs. Home 39
New Mental Nurses' Co-operation 39
St. John's & St. Thomas's House 41
St. Luke's Hospital 41
Temperance Assoc. Male & Female Nurses 40
The Nurses' Association 39
York Road General Lying-In Hospital... 41

HOUSE AGENTS—
Bedford & Co. 37

TRANSFER AGENTS—
Atkins, W. S. 36
Blundell & Co. 41
Fieldhall, Ltd. 41
John Bell & Croyden, Ltd. 40
Lee & Martin 41
Manchester Med. & Schol. Association... 41
Medical and General Business Agents.. 41
M.P.U. Agency, Limited 43
Needes, H. 41
Needes, J. C. 41
Peacock & Hadley 41
Scholastic, Clerical & Med. Association. 42
The Medical Agency 41
Turner, P. 36, 40

MISCELLANEOUS—
Anderson & Son—Doctors' Acct. Forms.. 38
Consulting Rooms, etc., to Let 38
Hamilton—Bottle Wrappers, Labels, &c. 4
Income Tax Specialists—Hardy & Hardy 6

*** *It must be understood that the acceptance by the British Medical Association of an advertisement does not imply a recommendation and that no responsibility is accepted with regard to the accuracy of the statements therein contained.*

SCALE OF CHARGES FOR ADVERTISEMENTS.

	£	s.	d.
Six Lines and under	0	9	0
and for each additional line	0	1	6
Whole single column (three columns to page)	7	10	0

	£	s.	d.
Half single column	3	15	0
Whole page	20	0	0
Half page	10	0	0

An average line contains six words.

Births, Marriages, Deaths, 9s. per insertion.

An Address
ON
SOME PROBLEMS OF PROSTATECTOMY.

DELIVERED BEFORE THE HARVEIAN SOCIETY, NOVEMBER 16TH, 1922,

BY

SIR JOHN THOMSON-WALKER, M.B., F.R.C.S.,

SENIOR UROLOGIST AND LECTURER ON UROLOGY, KING'S COLLEGE HOSPITAL; SURGEON TO ST. PETER'S HOSPITAL.

MANY patients are strangely unwilling to undergo any treatment as a preliminary to operation, partly owing to the desire to get the operation over quickly, and partly to lack of understanding of the gravity of the post-operation complications. The more one sees of prostatic surgery the more one is convinced that many of the complications which follow prostatectomy, some of which may be fatal, are avoidable by treatment before the operation. I will discuss two of these complications.

1. BOWEL COMPLICATIONS.

Post-operative distension of the bowel may occur in all degrees of severity, from a slight flatulent distension with difficulty in getting the bowels opened after the operation, to a prolonged distension of the bowel ending fatally from pressure on the diaphragm and interference with the heart's action. It occurs also in all degrees of acuteness or chronicity.

The most striking example of an acute case that I have seen was a man of 60 with a full abdomen and flabby muscles, from whom I removed an enlarged prostate and a bladder growth. The operation was simple, and there was little bleeding. Progress was normal until the fourth day, when there was a sudden pain in the epigastrium in the early morning. This disappeared, but reappeared later, and the abdomen commenced to swell up. The distension became so acute that the skin was tense and glazed. After two hours' acute distension the heart became embarrassed and the patient died. A doctor related a case to me of a woman, aged 50, who suffered from distension of the abdomen uncontrolled by treatment for seventeen years, with about six periods, lasting two or three days, of intermission, during which the abdomen became flaccid. The urine contained pus and blood. *Post mortem* both kidneys were septic and contained stones. This is an example of the condition in its most chronic state. Between these two extremes are the common types, lasting for a few days to ten days. The post-operative cases are usually controlled by treatment, but may cause much anxiety and are occasionally fatal. This post-operative distension in urinary surgery is not confined to prostatic and bladder cases, for it is not uncommon during the first few days after kidney operations, and may occur in septic kidney conditions without operation.

In looking for a cause for the condition we must remember that in kidney operations the colon is stripped from its attachment to the kidney and below this, and there is sometimes a good deal of trouble in separating adhesions at the extra-peritoneal aspect of the colon. When we remember also that in septic kidney conditions perinephritis is constantly present, and that this must involve the contiguous wall of the colon, there is no difficulty in recognizing that a local paralysis of the colon is likely to occur leading to distension with flatus, which spreads to other parts of the colon.

In prostatic cases so simple an explanation is not possible. In most of those I have seen the colon was distended, and constipation and hiccup were frequent, but in some cases the stomach was the organ affected, and the distension affected the upper part of the abdomen; in these vomiting of coffee-ground material is usually a symptom. Most of these are cases of enlarged prostate with back pressure on the kidneys, and in some of them, such as that which I have described, uraemic symptoms actually appear. It is likely, therefore, that uraemia may have something to do with causing the condition. But there are cases that occur in younger men without sepsis or uraemia.

Two elements, I believe, enter into the causation: one is flatulent distension of the bowel from intestinal fermentation, and the other is exhaustion of the sympathetic nervous system resulting from uraemia, intestinal toxaemia, or shock. Recently it has been suggested that post-operative dilatation of the stomach is due to dragging on the mesentery by the small intestine dropping into the pelvis after the removal of large pelvic tumours (Borchgrevink).

Having recognized that such a condition may complicate prostatectomy, is it possible to foretell its occurrence and do something to prevent it? It is, I believe, possible to do so.

There are two different types of patient that are liable to this condition—a thin type and a stout type. Imagine a thin man of 60 with a sallow complexion. He complains of prostatic symptoms; the prostate is enlarged, and there is a varying amount of residual urine. Further investigation shows that he suffers from flatulent indigestion after meals, and has to be careful about his diet; his teeth are probably decayed and there is pyorrhoea; the tongue is coated. The abdominal wall is thin, and should lend itself to easy palpation; but the bowel is full of gas, the percussion note tympanitic, and abdominal palpation is difficult. The other type is a stout, flabby man of 50 or 60, often of the Jewish race. He is fond of rich, fatty foods, and is immoderate in his indulgence in them. The abdomen is prominent, rounded, and tense; there is no pyorrhoea nor decayed teeth. When you meet with an enlarged prostate with either of these types you may expect post-operative trouble from the bowel.

How can we prevent this complication and how treat it when it occurs?

In all such patients I recommend a course of four or five weeks' bowel treatment after the teeth have been carefully overhauled. This question of teeth is very important; it affects not only the bowel risks but also the pulmonary risk. Oral sepsis is the cause in some degree, if not wholly, of the flatulent dyspepsia of the first type of case. It may take five or six weeks or even longer for the dentist to treat the oral sepsis, and there may be considerable difficulty in getting the patient to consent to the dental treatment.

All these intestinal-risk patients, however, do not have decayed teeth and pyorrhoea, and the second type very often have good teeth. The bowel itself must therefore be treated.

I do not presume to instruct such an assembly as this in the treatment of flatulent dyspepsia. Let me mention, however, the lines of treatment that have been most successful in the prostatic cases I have seen. They are the restriction of starchy foods and green vegetables in the diet, bowel antiseptic treatment and bowel tonic treatment, and the avoidance of saline purgatives. Abdominal massage and electrical treatment of the bowel are also useful when the bladder is not distended.

Now let us turn to the post-operative treatment. In the average patient the immediate preparation of the bowel for operation consists in giving a dose of castor oil two nights before the operation and washing out the colon on the morning of the operation. It is, I think, not unusual at present to avoid purgatives altogether before a surgical operation, on account of the bowel disturbance that may be caused. While this may occasionally be good policy where only twenty-four hours is given for such preparation, I cannot but feel that a prolonged and careful treatment of the bowel is a much sounder surgical proceeding and should always be aimed at. After the operation the bowel is left quiet for three or four days, and then a dose of castor oil is given. This is done in order to avoid straining after the operation, which sometimes causes bleeding.

If after the operation the patient commences to show distension of the abdomen or vomiting of dark coffee-ground material, a purge (castor oil) must be given at once. In some cases the stomach is distended and there is persistent vomiting. Here the stomach tube should be passed and the stomach washed out. Sometimes large quantities of dark brown fluid are removed, and the washing will have to be repeated.

Borchgrevink, who looks upon dilatation of the stomach after abdominal operations as due to dragging on the mesentery causing obstruction at the duodeno-jejunal junction, recommends the prone position and elevation of the pelvis; and operation has been recommended with the object of raising the intestines from the pelvis and relieving the drag on the mesentery, and also of removing adhesions. I have not met with a case of post-prostatectomy distension where this procedure held out any prospect of success.

The more common cases have distension of the colon and hiccup, but no vomiting. Pituitary gland is a good drug in these cases, and ergot and strychnine may also be given. A high rectal tube should be passed and the colon washed out, and a tube left for several hours at a time in the rectum. When the patient is stout he should be made to lie on his side,

instead of being propped up in a sitting position, as the passage of flatus is facilitated by this position. Various enemata are given—soap and water, ox-gall, turpentine. Care is necessary in giving enemata of turpentine in old feeble patients. In a hospital patient I once saw sloughing of the whole thickness of the rectal wall in a circular cuff following a large turpentine enema.

2. Kidney Complications.

Of all the risks to which the sufferer from enlargement of the prostate is exposed those connected with the urinary tract are the most common and also the most frequently fatal. These complications are, however, the most amenable to treatment before operation. They are sepsis and renal inefficiency.

I will discuss renal inefficiency. The patient who suffers from an enlarged prostate has reached the time of life when some interstitial change in the kidney is not uncommon, but apart from those changes which result from the effects of obstruction in the renal tissue it is rare to find a case where chronic nephritis causes anxiety in connexion with prostatectomy. Occasionally such a case is met with, and the condition is much less amenable to treatment than that in which there are kidney changes due to back pressure alone.

With the gradual increasing obstruction of an enlarged prostate residual urine accumulates, and the tension within the bladder, ureters, and renal pelvis increases. This produces interstitial nephritis, the extent of which varies with the duration and degree of obstruction. The renal function in such cases is impaired. The patient suffers from a series of symptoms which are characteristic of this type of kidney disease. There is lassitude, headache, thirst, and loss of appetite. The skin is dry, the complexion sallow, and the tongue is dry, red, and glazed. Constipation is a common feature. In more advanced stages there is loss of flesh, buccal dysphagia, occasional vomiting, and the patient is drowsy during the day and restless at night. The most advanced stage is complete anorexia, and there is frequent vomiting, constant drowsiness with restless delirium at night, and finally coma and death. Twitching of the muscles in a slight degree may be present, but is not a marked feature, and convulsions are absent.

Clinical symptoms are invaluable in the diagnosis of renal inefficiency, but there are cases where they are deceptive, and for over twenty years urinary surgeons have endeavoured to measure the renal function accurately by means of various tests. These have been very fully discussed of late, and I need not discuss them in detail.

The tests that I use at present in prostatic cases are the forced urea elimination test and the estimation of the blood urea. I have abandoned the colour tests in prostatic work, although I not infrequently use indigo carmine in kidney cases. The forced urea elimination is a valuable test of the renal function in these surgical cases, and comes nearer to demonstrating the full functional power of the kidneys than any other that we possess. The significance of the figures produced by this test is variously interpreted. The high figures require no discussion. A kidney which secretes 2 per cent. of urea and over is sound enough for any surgical procedure. It is the low figure that is of importance. What is the reduced urea concentration figure that becomes dangerous?

For some time I found in one of my hospitals that an able house-surgeon, keeping himself abreast of current opinion, was sending up a series of cases for bladder drainage by cystotomy as a preliminary to prostatectomy. These patients were then kept waiting for some weeks or months before the prostate was removed. This was on account of impaired renal function, the urea concentration being 1.4 to 1.6 per cent. Thus a very simple rule of thumb was developing—namely, urea below 2 per cent., drain the bladder and wait; above 2 per cent., single-stage prostatectomy. This arbitrary rule did not appear to me to be justified, and I decided that unless some other factor contraindicating operation was present I would operate in all cases when the urea concentration figure was above 1 per cent. The results have justified this procedure. This does not, of course, mean that all cases with a urea concentration above 1 per cent. are suitable cases for prostatectomy; there are many other factors besides this urea concentration figure to be considered.

In cases where the renal function is severely impaired the blood area becomes an important indication of the renal function. As Maclean points out, the figures given as normal for the blood urea—namely, 20 to 25 per cent.—are too low in dealing with old men, and a blood urea of 40 to 50 per cent. may be present without indicating serious impairment of the renal function. I recently operated on a patient whose blood urea was 58 per cent., and who had been refused a single-stage prostatectomy on this account. The patient was in other respects a healthy man, and I disregarded the high blood urea. Recovery from the operation was uneventful.

The blood urea is dependent upon other factors than the urea elimination by the kidneys, such as the amount and composition of the food, the condition of the liver, and the circulation. This test should therefore only be used in conjunction with the urea concentration test. If used apart from the latter it is apt to be highly misleading. A high urine urea with a high blood urea means that the kidneys are healthy, but the supply of urea is excessive. A low urine urea with a low blood urea may mean a lowered renal function. A low urine urea with a high blood urea is significant of serious impairment of the renal function.

It is not possible to take these tests at their face value and use them in rule of thumb fashion as indications as to whether prostatectomy should not be performed in a given case, or to base a prognosis upon them. We have to remember that these tests tell us only the reading of the renal function at the time and under the conditions that the test was made. This does not exhaust the possibilities of variation of the renal function.

There are two important factors to be reckoned with in estimating the value of a low renal function reading—namely, temporary depression and permanent reduction of the function.

Let us take a man with an enlarged prostate and chronic retention of urine with the bladder distended to the umbilicus. The various tests show that the renal function is very inefficiently performed. Now if the decision in regard to operation and the prognosis are based upon the figures shown by these tests, a totally erroneous view of the case may be obtained. A large part of the depression of the renal function may be temporary and due to causes that can with surgical judgement and care be eliminated. What proportion of the reduction of the renal efficiency is due to the existing obstruction and back pressure on the kidney and what to permanent reduction due to chronic interstitial nephritis the tests do not show us, and until this has been ascertained no true clinical picture of the case can be formed.

Another fallacy that has always attended the tests of the renal function is the difficulty in estimating the total functional power of the kidneys. There is a large amount of reserve power in the kidney that is not brought into action under ordinary conditions. In normal kidneys the reserve power amounts to over 50 per cent. of the total renal function. This part of the renal function may be gradually encroached upon by destruction of the renal tissue by disease and the tests of the renal function may show little change. It is this potential renal function that is so important in estimating the risks in a doubtful case.

Many years ago Albarran tried to estimate the reserve renal function by giving diuretics and observing their effect upon the renal function tests then in use. The method was not, however, successful. The forced urea elimination test comes nearer to estimating the reserve function than any other test that we possess.

The decision to operate or to refuse operation in a case of enlarged prostate with impaired renal function rests upon the judgement of the surgeon, and not on the dicta of the laboratory. What the surgeon requires is as accurate an estimate as possible of the renal function at the time of the test. This estimate is most usefully set out in terms of urea elimination and urea retention.

The compilation of formulae is, I think, unnecessary. Maclean uses a urea concentration factor, to obtain which he divides the figure of the urea in milligrams in 100 c.cm. of urine by that in 100 c.cm. of blood. This factor should normally be 60 to 80. When the urea efficiency is somewhat impaired it may be only 30 or 40. If below 20 the condition is generally bad, and if below 10 it is usually severe. I prefer the plain figures of the blood and urine urea with a note as to any likely fallacy that may have affected the individual figures.

When formulae are used various corrections and modifications begin to be added, each with a possible margin of error, until finally we get formulae like those of Koranyi or Ambert, so overburdened by corrections as to have little or no real clinical value.

It is not necessary for a successful prostatectomy that the renal function should be perfect or even approximately perfect. A reduced renal function may be quite adequate for the operation, and the laboratory figures of the renal function tests form only one factor in estimating the prognosis for operation among many, which include the general build and constitution of the patient, the weakness and soundness of other organs, experience of the operator, and, above all, those who will have the immediate care of the patient after the operation and the surroundings in which recovery from the operation will take place.

TWO-STAGE OPERATION.

The next question that naturally follows on the estimation of the renal function is whether a one-stage or a two-stage operation should be done.

The advantages claimed for a two-stage operation are: shock reduced; less haemorrhage; sepsis reduced; relief of back pressure; and time allowed for the kidneys to resume their normal function.

The disadvantages of the two-stage operation are: two operations and two anaesthetics; increased time in hospital or home; enucleation of the prostate more difficult owing to rigidity of the abdominal wall; post-operative hernia more frequent.

The two-stage operation has now become very common, and in some parts of America it is the only method practised in all cases.

The disadvantages of the two-stage operation are very obvious and are of such a nature as to appeal to the patient. There must therefore be some very definite advantages in the method before it can be adopted.

In the ordinary straightforward case the two-stage operation is certainly not safer than the one-stage operation. Shock is not a factor in uncomplicated prostatectomy. Rough handling, long exposure of the patient from unmethodical technique, and inadequate anaesthesia may produce it, but these are individual to the surgeon and will as likely attend a two-stage as a one-stage operation.

It is said by some surgeons that they get less haemorrhage in a secondary than in a primary one. Where there is severe cystitis and engorgement of the prostate and prostatic urethra from recent retention of urine this may be so; but in the average case, and in any case where adequate measures for the control of haemorrhage are taken, this is not so and no advantage from the preliminary cystotomy in this respect need be expected. In my own practice I select three very definite types of case for the two-stage operation. These cases form a small minority of the cases of prostatic enlargement, and my routine practice is to perform a one-stage operation.

The cases in which I prefer a two-stage prostatectomy are: (1) chronic urinary retention; (2) sepsis; (3) cases in which catheterization is difficult or impossible and some serious complication, such as bronchitis or pneumonia, is present.

1. *Chronic Urinary Retention.*

This is recognized as a very dangerous condition. One-stage prostatectomy in these cases is a fatal operation, from suppression of urine due to the sudden fall in urinary pressure. Intermittent catheterization, followed by prostatectomy after some time, is more successful, but it is a dangerous procedure at the best. The danger lies in the introduction of sepsis. With the sudden fall in urinary pressure at the time of catheterization and the rise of pressure during eight or ten hours after the infection very readily ascends to the kidney, causing septic pyelonephritis.

If the bladder is drained it must be slowly emptied and when empty the pressure kept at zero by continuous drainage. This may be carried out by the retained catheter, and if it is possible I prefer it to a preliminary cystotomy, for the intravesical pressure can be let down very gradually, no anaesthetic is necessary, and there is no interference with what will later be the operative area. But the catheter drainage is not always possible. The patient is occasionally intolerant of the catheter, or the urethra may be unsuitable for the retained catheter, or clots or mucus from the bladder may persistently block the catheter. Cystotomy will then be necessary for the drainage of the bladder. This may be carried out under local anaesthesia or under gas and oxygen.

The length of the interval between the preliminary cystotomy and prostatectomy depends on the condition of the kidneys; of this the clinical symptoms and the urea tests are the guide. The improvement may be rapid, and ten days may suffice for the kidneys to regain an almost normal secretion. On the other hand, weeks or months may elapse before the renal function has so far recovered that the prostatectomy may be safely performed.

2. *Sepsis an Indication for a Two-stage Operation.*

The combination of sepsis and uraemia from back pressure is known as urinary septicaemia, and there are all degrees of severity of the condition. In some cases of enlarged prostate with urinary infection the bladder is the seat of the infection and the kidneys are very slightly involved. In other cases there is chronic septic pyelonephritis.

In any case cystotomy is the proper method of treatment. Catheter drainage is worthless, for the catheter becomes blocked with mucus and pus, the outlet is not sufficiently free, and the washing cannot be carried out in sufficient volume to be effective. Suprapubic cystotomy is performed and a catheter tied in the urethra. Continuous irrigation is installed and may be carried out for as long as necessary. Continuous irrigation for a week or ten days will clear up the cystitis which is not complicated by some local condition such as stone or diverticulum, or which is not secondary to renal infection. Even when pyelonephritis is present very definite improvement is noted in the renal symptoms when the cystotomy and irrigation are established.

If the renal infection is moderate a stage will be reached when it is safe to perform prostatectomy. But where serious bilateral pyelonephritis is present the preliminary improvement is not maintained, the urine contains a heavy deposit of renal pus, and the symptoms of urinary septicaemia gradually increase and the patient dies.

3. *Difficult Catheterization and Serious Complications.*

The third indication that I accept for the two stage operation is when there is urgent necessity to relieve the bladder, but there is some complication which makes prostatectomy dangerous. There is no such thing as an urgent prostatectomy. The only urgency in a case of enlarged prostate is to empty the bladder and to provide for drainage. The permanent removal of the obstruction can wait until the patient is in a fit condition for a serious operation.

In most of these cases it is possible to empty the bladder by catheter, and in a case of enlarged prostate I have drained a bladder by retained catheter during the whole course of an attack of lobar pneumonia followed by septic arthritis of the shoulder-joint. But there are cases where it is not easy or possible to do this, either from the difficulty of passing the catheter or of retaining it. In such cases suprapubic cystotomy will overcome the difficulty and place the patient in a position to undergo treatment for the extraurinary complications. Apart from these classes of case I see no necessity to divide the operation of prostatectomy into two stages.

EARLY OPERATION.

Fortunately the cases in which a two-stage operation is necessary are becoming fewer than they were some years ago. The two-stage operation is almost always an attempt to repair the mistakes of earlier neglect or unskilful treatment.

In a previous address I ventured to recommend early operation, and was called to task for advocating operation on every old man with a slight increase in the frequency of micturition. This was quite a mistaken view of my meaning. What I suggested then and would like to insist upon now is that every old man with increased frequency of micturition should be carefully examined to see if this frequency is due to changes in the prostate which give rise to obstruction.

Frequent micturition in old men is too often looked upon as the physiological accompaniment of advanced age, and no examination is considered necessary. I believe that this symptom in old men is always the result of a pathological condition, and although the changes in the prostate which produce it do not in the majority of cases progress so as to cause obstruction, still there are a large number of cases where there is advancing obstruction and yet frequent micturition remains the only or the most prominent symptom. In the latter the obstruction may, from the neglect of this symptom, be allowed to advance to a dangerous degree.

Wherein lies the Necessity for Early Operation?

We have from time to time reports in the medical press by enthusiastic operators who have successfully operated upon old men of 80 or 90 years, and it is in the experience of all

urinary surgeons that prostatectomy can be successfully done in extreme old age. We know from experience that prostatic patients who are desperately ill, sometimes apparently moribund, from renal failure due to chronic urinary obstruction or from urinary septicaemia, may with proper strategy in treatment and prostatectomy be restored to health in an almost dramatic manner.

But there is another side to this question. The dangers of prostatectomy in a man over 80 are, other things being equal, undoubtedly much greater than those of an average man of 60. We cannot therefore be indifferent to advancing age as an argument in favour of prostatectomy early rather than late.

Then in regard to the back pressure and the septic cases. The return to health, although dramatic, is at best a comparative one. A careful review of these cases after operation will show that the tale of sepsis does not usually cease with the recovery from the operation. There are still attacks of pyrexia from exacerbation of chronic pyelonephritis, and there may be recurrent attacks of epididymitis, although the continual absorption of toxins kept up by the obstruction has been eliminated by the operation. Even after the removal of the obstruction these patients are never in the condition of health that they would have been had they been able to avoid altogether the period, sometimes extending into years, of urinary sepsis and back pressure. There can, I think, be little doubt that the duration of life in these patients is shortened as a result of the permanent damage done during that time. It is to avoid this period of sepsis and back pressure that I advocate early operation.

It is a common argument that the catheter may first be tried, and then if it fails operation may be performed. Failure here means sepsis of a severe type, often with the inability on the part of the patient or the practitioner to pass the catheter, owing to the increased size of the prostate or the tortuosity of the urethra. When this stage has arrived the damage from sepsis has already been done and is in part, if not wholly, irreparable. Catheter life is commenced with the certainty that in the great majority of cases infection will occur, and the prognosis, immediate and remote, in a patient with enlarged prostate and urinary infection is infinitely worse than that in a patient with enlarged prostate without infection.

A second point in favour of early operation is the "silent" prostate with chronic urinary retention.

Cases are met with where a patient complains of nocturnal incontinence as the only urinary symptom, and on examination the bladder is found distended to the umbilicus. The minor symptoms of uraemia are often present but may have been overlooked. It is not infrequent to find in these cases that the prostate was examined some years previously on account of frequent micturition and was found moderately enlarged, but the symptom subsided and the patient noticed nothing further in regard to the bladder until nocturnal incontinence commenced. These cases are among the most dangerous and difficult to treat in prostatic surgery.

The only way to prevent the development of so grave a complication is to examine all cases of frequent micturition in old men thoroughly, and keep them under observation. If residual urine is found operation should be recommended.

A third reason why operation on an enlarged prostate should not be indefinitely delayed is that malignant changes may take place in a prostate the seat of simple enlargement.

We meet with this change in two forms. In one a large elastic movable prostate shows at one part, on rectal examination, a firm inelastic area on the surface of one lobe, often towards the base. On enucleating the prostate the capsule at this part strips with difficulty, and a layer of leathery capsule is left behind. On microscopic examination this part of the prostate shows malignant changes, while the rest of the enlarged gland shows the usual appearance of cystic adenoma.

The second type of case is where an enlarged prostate shells out satisfactorily and appears to be simple, but the pathologist reports that some part in the interior of the gland shows the histological changes of malignant growth. The number of these cases in the total number of prostatectomies is not great, but it is sufficiently large to make them a factor in advocating early operation. In 100 consecutive cases of prostatectomy for simple enlargement of the prostate the pathologist reported that 16 showed areas of malignant change, and 14 were doubtful but were labelled "precancerous." Most of these were prostates of large size. In 11 there was nothing in the clinical examination to raise a suspicion of malignancy. In 4 there was a small firm area in the region of the seminal vesicle on one side, and in one case the prostate was rather firm in consistence.

Early operation requires definition. I regard all cases of enlarged prostate when the gland is causing sufficient obstruction to produce residual urine of one ounce or more on several examinations as requiring operation. There are some exceptional cases where a large elastic prostate does not produce residual urine. In these cases I also advocate operation. In cases where frequency of micturition is the only symptom, and there is no residual urine and no prominent enlargement of the prostate I do not think operation is necessary.

Type of Operation.

The operation that Freyer described was a blind operation. The bladder was opened through a small suprapubic incision and the prostate was pushed up by a finger in the rectum while the other hand pushed down the abdominal wall, and the prostate was reached and enucleated with the forefinger. Bleeding was controlled by washing through a catheter with silver nitrate solution. A large tube was placed in the suprapubic wound for four or five days and then removed and the wound allowed to heal.

While recognizing the success and wide application of this operation I have pointed out certain defects to which it is liable. To remedy these defects I have suggested and practise an operation so much modified that I think it may fairly be regarded as a different operation from that practised by Freyer.

The defects to which I have referred are:

1. Certain difficulties in connexion with the abdominal wall.
2. The method of controlling haemorrhage.
3. The frequency and persistence of sepsis.
4. Post-operative obstruction.

Watching Freyer for many years, and practising this operation myself, I have found that in certain cases a considerable amount of force is required to push the abdominal wall downwards towards the pelvis sufficiently far to reach the prostate. This is due either to the thickness of the abdominal wall or to rigidity from spasm of the recti muscles. A hard struggle on the part of the operator and deep anaesthesia are necessary to overcome this difficulty.

The method of controlling haemorrhage in Freyer's operation is primitive and unreliable, and would not be tolerated in any other operation of first importance. Even with every care sepsis was a frequent complication. I shall discuss sepsis later.

In a previous article I described 16 cases of post-operative obstruction following Freyer's operation. Such cases are of sufficiently frequent occurrence to demand some measure of prevention.

Open Operation

The operation I perform commences with a suprapubic incision sufficiently long to allow the right hand to pass completely within the muscular abdominal wall and sink into the pelvis. This entirely disposes of the difficulty of approach due to spasm of the recti muscles, and, further, it obviates the necessity for introducing the finger into the rectum, for the enucleating finger now reaches the apex of the prostate without difficulty.

I undercut the skin on either side of the wound for the introduction of supporting mattress sutures at the end of the operation.

The bladder is opened and the prostate enucleated with the gloved forefinger and removed from the bladder. A catgut stitch is placed in each lip of the bladder wound and the patient raised into the Trendelenburg position. The catgut slings are held up and my bladder retractor introduced. This gives a full view of this opening in the bladder base through which the prostate was removed.

All tags, folds of bladder mucous membrane, shreds and semi-detached plaques of capsule, or nodules of prostate and loose strips of urethra are carefully removed. The posterior lip of the opening is examined, and if a definite fold overhangs the prostate cavity a wedge with the base at the edge of the fold and the apex in the middle line is cut out of this.

A haemostatic stitch is introduced on each side of the neck of the cavity with special bladder needles, and a continuous suture of fine catgut is introduced from the right side round the posterior edge and finishing on the left side. This suture includes the mucous membrane of the bladder, the torn edge

of the sphincter vesicae, and the upper torn edge of the remains of the prostate capsule if, as frequently occurs, this is defined.

Haemorrhage is usually controlled by these sutures. If it still continues, a spouting vessel may be seen deeper in the cavity, and this is clamped and crushed. If, as rarely happens, the bleeding continues, and if there is much venous bleeding from the ascending limb of the prostatic plexus in the anterior wall of the cavity, the catheter is drawn well into the bladder and the prostatic cavity packed carefully round this with iodoform gauze. A tube rather smaller than the large Freyer tube is placed in the bladder. The retractor blades are changed and used to separate the recti and expose the anterior surface of the bladder. The bladder wound is closed up to the tube with a continuous suture. A small prevesical tube is introduced and the retractor removed. Two catgut mattress sutures are placed through the rectus sheath and recti, and a continuous catgut suture through the cut edge of this sheath.

The objects of this modification of the operation are:

1. To eliminate the difficulty of approach to the prostate.
2. To control bleeding.
3. To reduce sepsis.
4. To prevent post-operative obstruction.

Sepsis.

I have elsewhere[1] discussed haemorrhage and post-operative obstruction, and will here deal more fully with sepsis.

We have long ago left behind the form of sepsis due to staphylococcal infection, where the wound became encrusted with phosphates and healing was delayed and difficult. These infections were undoubtedly due to insufficient preparation of the skin of the patient and of the surgeon's hands, or to instruments. The form of sepsis that occurs during convalescence and after prostatectomy is an infection with *Bacillus coli* or a mixed infection with *Bacillus coli* as the dominant organism.

I. One factor in its production was the rectal finger, combined with the difficulty of approach due to a small abdominal wound. Changing the enucleating hand when one hand has been used to push up the prostate from the rectum must be a dangerous procedure even where washing and a change of gloves has been made. Such a technique would never be tolerated in an intraperitoneal operation, and it ought equally to be abolished in an intravesical operation. Apart from the change of the enucleating hand, the subsequent steps of the operation necessitate the use of both hands, and the danger of infection is equally great at this part of the operation.

In addition to carrying infection there is, I believe, a danger of direct infection through the rectal wall and the wall of the prostate cavity, due to damage done by forcible manipulation between the rectal and the enucleating finger.

The entire elimination of the rectal finger, and making an abdominal incision sufficiently long to give free access to the prostate so as to permit of gentle enucleation, is, I believe, an important means of prevention of sepsis.

II. A second factor in the causation of sepsis after the operation is the presence of partly detached shreds of mucous membrane and prostatic capsules, prostatic nodules, and strips of urethra. These necrose and form a culture ground for bacteria, and are often discharged some time after the wound has healed as phosphate encrusted masses. In the open operation they are completely removed.

III. There is a tendency for stagnant urine, blood clot, and mucus to collect in the prostatic cavity, and for infection to spread along the column of urine in the tube or alongside the tube from the skin after the operation.

The following measures are used to combat this source of sepsis:

A catheter is tied in the urethra with the eye in the prostatic cavity, and the cavity and bladder are freely irrigated through the catheter daily. Or the urethra and prostatic cavity and bladder are irrigated by Janet's hydrostatic method.

Should there have been sepsis before the operation, or anything to suggest that infection has taken place after the operation, continuous irrigation of the prostatic cavity and bladder with antiseptic solution is carried out by connecting a reservoir to the catheter and draining the Hamilton Irving box into a pail. The continuous irrigation is continued for several days. As a routine a gauze bag filled with large boracic acid crystals is placed in the Hamilton Irving box and renewed twice daily.

With this attention to detail infection has steadily declined in my cases.

IV. Before leaving this subject of sepsis I should like to say a word in regard to the persistence of sepsis which was present before the operation.

There are three important sources of persistent sepsis—namely, pyelitis and pyelonephritis, diverticulum of the bladder, and seminal vesiculitis.

Time does not permit me to deal with these fully, but a short reference may be made to seminal vesiculitis. I believe that in a large proportion of the cases where sepsis persists after prostatectomy this persistence is due to seminal vesiculitis. I have in a number of these prostatic cases removed the seminal vesicles through the floor of the bladder, and will describe the operation fully elsewhere.

It would prolong the prostatectomy too greatly to dissect the seminal vesicles in every septic case at the end of the prostatectomy, but I think the possibility of doing this should be kept in mind.

In two cases of prostatectomy with severe sepsis unaffected by any pre-operation treatment I incised the seminal vesicles through the floor of the bladder by an incision radiating from the centre of the posterior lip of the prostatic opening backwards and outwards to just internal to the ureteric orifice. In these cases I found the vesicles full of pus.

The question should, I think, be raised, in cases of sepsis persisting after operation in spite of energetic treatment, as to whether the vesicles are the source of the infection and if a transvesical operation for their removal should not be done.

Anaesthesia.

The patients who are submitted to prostatectomy present many difficulties to the anaesthetist, and I will not venture to encroach on his province.

I may, however, make some remarks from the point of view of the surgeon. A considerable proportion of the prostatic cases have a high blood pressure or some degree of myocardial change. Many have emphysema and some have bronchitis.

A pure ether anaesthesia is not suitable for these cases on account of post-operative lung complications. A mixture of chloroform and ether suits them better, but with this also one fears the possibility of post-operative lung troubles.

Gas and oxygen produces a rigid abdominal wall that interferes with the surgical manipulations. This is of less importance in my open operation, where the enucleating hand works inside the muscular abdominal wall and does not require to push it inwards to reach the prostate.

If gas and oxygen is used the patients should have a large dose of morphine, as they suffer greatly from pain on coming round at once at the close of the operation. Where the blood pressure is high, and especially in a case where there is a cerebral haemorrhage, gas and oxygen is an unsuitable anaesthetic owing to the rise of blood pressure it produces.

The anaesthetic which I prefer is spinal anaesthesia with a modified dose of stovaine and just sufficient C.E. to render the patient unconscious. This form of anaesthesia has less severe after-effects than any other, and my colleagues Dr. Hughes and Dr. Shipway have given it for me as a routine method for several years. The most potent objection to this form of anaesthesia is the fall in blood pressure, amounting to 20 to 40 mm. of mercury.

This fall is generally compensated by turning the patient into the Trendelenburg position, but the pressure may again drop at the end of the operation when the horizontal position is resumed. Where the arteries are very rigid and myocardial changes are present this fall in pressure may lead to circulatory failure during the twenty-four or thirty-six hours following the operation, and in such cases I think it is better to avoid spinal anaesthesia.

Local anaesthesia, even when thoroughly carried out, is not a satisfactory method for prostatectomy. The enucleation of the deeper part of the prostate and the tearing of the urethra cannot be carried out painlessly by this method.

[1] *British Journal of Surgery*, 1920, vol. vii, No. 28, p. 525; BRITISH MEDICAL JOURNAL, August 27th, 1921; *Lancet*, 1921, i, p. 1003.

SURGICAL TREATMENT IN CASES OF PULMONARY TUBERCULOSIS.*

BY

H. MORRISTON DAVIES, M.D., M.Ch., F.R.C.S.,

MEDICAL SUPERINTENDENT, VALE OF CLWYD SANATORIUM; CONSULTING SURGEON, UNIVERSITY COLLEGE HOSPITAL, KING EDWARD VII WELSH NATIONAL MEMORIAL ASSOCIATION, AND TO THE CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST.

In considering the surgical treatment of pulmonary tuberculosis, the first point that must be discussed is why and when cases of tuberculosis of the lungs should be treated by operative measures. There are three reasons why surgical treatment may succeed in arresting the disease or in prolonging life when other means have failed.

1. If the resistance of the individual patient is such that it failed him only when extremely run down in health, and possibly badly nourished or suffering from great mental strain, the alteration of these conditions by general treatment alone will suffice to make his resistance adequate to deal with the tubercle bacilli, as long as the former bad circumstances do not recur. But if the resistance of the patient is sufficient only so long as the general health and fitness of the individual are really good, then each relapse from good health, every exposure to conditions not eminently suitable, will mean a relapse of the disease in the lungs and a spread of the tuberculous lesion.

It is extremely difficult (if possible) to increase the specific resistance of the patient to tuberculosis;† it is a much more feasible proposition to lower the virulence of the tubercle bacilli and in this way *relatively* to increase the patient's resistance. The most efficient means we know of for reducing the virulence of these organisms is by rest—and in the lungs rest is obtained by immobilization by collapse.

2. As soon as the disease has passed beyond the early granulation stage fibrosis sets in and a completely new set of complications arise.‡ The alterations in the bronchial tubes (the secondary bronchiectasis) are the most serious results of the fibrosis, since they in turn are responsible for the retention of secretions and so for the secondary infections. These are the mechanical factors which eventually prove more difficult to treat and a greater menace to life than the organisms which are the original cause of the trouble.

3. The formation of a cavity by the breaking down of a group of neighbouring caseating granulomata, aided probably by the action of organisms other than the tubercle bacilli, leads to a condition which is often disabling because of the retention of secretions, and is dangerous because of the risk of haemorrhage. These mechanical changes can be very little influenced by medical treatment; only the symptoms of the pathological conditions associated with them can be, for the time being, alleviated. By surgical treatment it is possible to collapse the lung, and whenever complete collapse is obtained then not only is that organ put at rest, but the ill effects of the excessive fibrosis are abolished; the shrinkage of this tissue can proceed without involving all the surrounding and adjacent tissues and structures; the dilated bronchial tubes are collapsed and the spaces which retained the secretions are abolished; cavities have their walls approximated and are no longer a source of danger and constant reinfection: they are no longer cesspools for organisms to flourish in and from which to pour out their toxins into the circulation. So far as the collapsed lung is responsible for the symptoms, the cough is abolished and sputum ceases, the fever due to the toxins disappears, and, if haemorrhage has been a symptom, the danger and fear of that too is done away with; this in itself is a great mental relief to some patients.

The general health of the patient can now improve. That, together with the diminution in the virulence of the tubercle bacilli and the relative increase in the resisting powers of the patient, will place him in a most advantageous position for encapsulating the organisms and for making him more secure against a possible renewal of the invasion.

When the collapse is incomplete it may be said that the advantages obtained are proportional to the degree of collapse. It comes to this, therefore, that once chronic pulmonary tuberculosis has progressed and has caused a degree of fibrosis beyond what can be compensated for by compensatory changes in the remaining healthy lung tissue, the disease may be said to have progressed beyond the early stages, and that from that time onwards, if some permanent improvement is to be looked for, surgical treatment must be considered as an aid to medicinal and to the ordinary sanatorium measures.

Such are the reasons why surgical treatment must be regarded as such an important asset. Now comes the consideration as to when a case is suitable. The chief postulate is that the disease must be unilateral, or that, if there is disease in the opposite side, it is neither extensive nor acutely active; but there are certain exceptions to which I shall refer later. Surgical treatment is indicated—

(1) For the treatment of the primary condition (*a*) when, although the resistance of the patient is moderate, he must return to work under unfavourable conditions; (*b*) when the resistance of the patient is insufficient to deal with the tubercle bacilli even under favourable conditions of environment, etc., as is shown either by inability to arrest the activity of the disease or by repeated relapses; (*c*) when it is imperative to control the risks of infection, as in the case of a mother returning to her home or her children, and in the case of patients (doctors and nurses) whose work brings them into contact with other people who are in indifferent health or in ill ventilated buildings; (*d*) when it is imperative that the individual should return to work at the earliest moment possible.

(2) When the secondary complications (the mechanical factors) are so advanced that it is impossible to control the symptoms (secondary bronchiectasis and cavity formation).

(3) When it is necessary to control haemorrhage.

(4) When there is tuberculosis of the larynx, which organ is being continuously reinfected from the lung.

(5) When there is pneumonic tuberculosis.

Against these indications for treatment by operation must be placed certain contraindications which are additional to those imposed by the extent of the disease in the lungs. The most important are albumin or sugar in the urine, tuberculosis of the intestinal tract, chronic gastritis, gastroptosis, chronic intestinal stasis of an advanced degree, and (though mentioned last of considerable importance) the temperament of the individual. In an extremely nervous or highly strung person it is probably wiser not to attempt an artificial pneumothorax.

When I was discussing the extent of the disease with which operative treatment could be regarded as practicable under ordinary circumstances, I said there were exceptions. In some cases of fairly extensive bilateral active infection artificial pneumothorax can be attempted.

1. When the disease is very active, with marked secondary change on one side, the prognosis is very grave, because of the hopelessness of producing any lasting improvement in this lung; then, as a desperate remedy, pneumothorax may be attempted, even though there is acute active trouble in the other side, provided that lung has shown any signs of improvement with complete rest in bed, and is not extensively affected by secondary changes.

2. When the collapsed lung has responded to treatment but, later, activity develops, does not subside, or increases in the other lung, artificial pneumothorax may be attempted in this second lung also. In such cases a partial pneumothorax, equivalent to about one-third of each lung, is aimed at. The following is a brief account of a case so treated.

When first seen there was very extensive disease in the right lung, and there was some active trouble in the left also. Collapse of the right lung was undertaken in the first place because of the extreme gravity of the case. At first there was improvement, but this was followed by a serious relapse due to a sudden exacerbation of the disease in the left lung. Last Christmas I despaired of saving her life, but felt there might be a faint hope if a partial pneumothorax could be done on the left side also. I allowed incomplete re-expansion of the right lung, and then produced a partial collapse of the left. This bilateral pneumothorax has been maintained ever since. She has since gained 2½ st. in weight, she runs a normal temperature, the last report of her sputum was negative, and she has been able to return home.

My experience is that bilateral partial pneumothorax is a quite justifiable procedure in such cases, as it is also in those in which one lung has been collapsed a year or more and then disease starts or recrudesces in the opposite lung. The lung first treated should be allowed to re-expand to about

---

* Being part of a lecture delivered before the University College Hospital Medical Society, October 19th, 1921.

† To what extent chronic intestinal stasis and a partial failure of the endocrine glands may be responsible for weakening such resistance, or to what extent the remedying of these pathological states may increase it, I am not able to say, but there must be a great interdependence in the proper functioning of the various organs.

‡ In acute miliary tuberculosis, the fibrosis is insufficient to produce these secondary complications and death results from the acuteness of the tuberculous toxins.

two-thirds its bulk and then a similar degree of collapse of the second lung produced.

Until I began to discuss the very serious type of case for which operative treatment may have to be considered as the last means of saving life I had not particularized as to the method whereby the collapse of the lung should be obtained. For these severe cases I have, however, specifically referred to artificial pneumothorax, as that is the only method of intervention that can be attempted for them. Collapse can be obtained either by intrapleural or by extrapleural separation of the lung from the chest wall, or by letting the chest wall fall in with the lung. Intrapleural collapse of the lung by artificial pneumothorax is the simplest of all these surgical procedures, and is therefore the one which must always be attempted before any other method is considered.

Of the technique, of the difficulties, of the complications, of the variations which are found, making each case almost a law unto itself, I am not going to talk to-night, as it is too vast a subject. I do, however, propose to discuss one complication—that is, adhesions—as I have had considerable personal experience in dealing with these, and it is a part of the subject which has been almost entirely neglected in this country except by myself. The type of adhesion under consideration is that which can be seen with the *x* rays stretching from the lung to the chest wall after partial collapse has been obtained. Such a band, by the pull it exerts on the lung, not only prevents that organ from collapsing to the required extent but tends to keep drawing it out again and to keep open the spaces, encouraging thereby the retention of secretions and the proliferation of the organisms of secondary infection.

These adhesions may be multiple or single, broad or fine; they may consist of fibrous tissue only or have fine blood vessels running along them. The lung at the point of their attachment to it may be drawn out into a cone, thus making the actual band look longer than it really is. The lung at this point may be apparently healthy, it may show tuberculous granulomata, or it may consist of a thin wall cavity. If either of the latter two pathological conditions exists, there is a considerable danger that the lung will rupture if too high a strain is put on it by producing too great a positive pressure in the pleural cavity. None of these details can be known without *x* rays, and it should be obvious therefore that attempts to collapse a lung without constant radiological control is risking disaster sooner or later. In nearly all the cases sent to me with complications to disentangle and treat, the trouble might never have developed had there been *x*-ray control.

Adhesions may be found between any part of the lung and the chest wall. By far the commonest position, however, is over the upper lobe, the parietal point of attachment being in the neighbourhood of the first, second, and third ribs. The second commonest site is between the mesial half of the base of the lung and the diaphragm.

Only the finest adhesions can be ruptured. If very fine bands are seen to be interfering with collapse and the lung at the point of their attachment is sound, it is justifiable to attempt breaking them by increasing the intrapleural pressure up to, but not beyond, 40 mm. of mercury. It may not be possible to raise the pressure so high—that depends entirely on the amount of pain and distress produced. One patient will complain of quite acute pain at a pressure equal to 10 mm. of mercury, and another tolerate one equal to 40 mm. of mercury or over, without even discomfort. The rupture will be felt by the patient, who will feel that "something has given way in his chest" and a sudden relief from discomfort or pain, if either were present immediately before. The operator will recognize the rupture by the sudden drop in the pressure and by the increase in the respiratory undulations.

If there is a single adhesion, too stout to rupture, and it can be seen that at its point of attachment to the lung that part of the organ is sound, then, unless rapid and complete collapse is imperative, an attempt can be made to stretch the adhesion by maintaining a steady high pressure in the pleural cavity. An adhesion which is more than about one-eighth of an inch in diameter will not stretch. If the band is too strong or there are more than one, the only treatment is by division. There are three ways of doing this: (1) by tenotomy without other opening through the chest wall than that made by the passage of the tenotome; (2) by the thoracoscope and electric cautery; (3) by thoracotomy and exposure of the adhesion. The first of these is my own method. It cannot be described as a simple operation, yet in some cases it has proved extremely easy. Everything depends on the position of the adhesion and the possibility of being able to get the adhesion quite tight before attempting to cut it. It is essential for this method that a clear view of the band be obtained with the *x* rays.

The patient is placed with his back to the *x*-ray tube. The screen is swung so that it can be turned out of the way or brought in front of the chest and mechanically supported in any position desired. The line of approach to the adhesion is through the intercostal space immediately below the band. The tissues which the tenotome will traverse are anaesthetized with 2 per cent. novocain. When this has been done and the cutting edge of the tenotome (which is of a special design) has been passed through the intercostal space into the chest the *x* rays are turned on and all other lights extinguished. The relationship of the point of the tenotome and of the adhesion can now be made out. The tenotome is pushed towards the adhesion and is moved up and down until it meets the band. The contact of these two can be both seen and felt. The edge of the knife is pressed on to the adhesion, which is then cut through by short sawing movements. If the band has not been made tight by a fairly high intrapleural pressure by an injection of gas a day or two beforehand difficulty will be experienced in cutting through it, as the fibrous tissue is very tough and resisting, and pressure serves only to displace the band downwards and to pull the lung downwards and outwards. The moment the adhesion is cut through the lung will be seen to drop mesially towards the mediastinum.

The opening made by the tenotome is so small that there is rarely more than a little surgical emphysema after the operation. Bleeding from the divided band is only rarely considerable; if it should occur, it will be checked by the increase in the intrapleural pressure. As an illustration that in a simple straightforward case the operation is not a serious one I have had one patient, a woman, who having had her band divided returned home (a distance of twenty-six miles) two hours after, and was at work two days later.

If the adhesion is a tough one some pain will be felt whilst pressure is being applied to it, owing to the pull of the band at its point of attachment to the parietal pleura.

The most likely complications are surgical emphysema and a small pleural effusion or possibly a haemothorax. Of more serious character are those which may result from the lung being injured in the division. This is likely to happen only if a cone of lung has been drawn out by the band and simulates a continuation of the mesial end. If a careful study has not been made beforehand, or if it is impossible to obtain a clear view of the whole length of the adhesion, then it may happen that this portion of lung tissue is cut and a traumatic pneumothorax or a haemopneumothorax or even a pyopneumothorax results. If any of these should happen, the increase in intrapleural pressure will force gas out through the incision in the pleura and produce a considerable increase in the surgical emphysema, whilst the possibility of infection must not be lost sight of.

Jacobaeus advocates the division of adhesions by the electric cautery. This necessitates two openings through the chest wall. Through the one is passed the thoracoscope—on the principle of the cystoscope—by which the adhesion is viewed, through the other the cautery. His results are extremely satisfactory. He is able to divide adhesions which might not be sufficiently visible to attempt by tenotomy, and he can work with a shorter interval of space between the lung and the chest wall. In the division, however, he is greatly hampered by the smoke from the burning of the adhesion, and has frequently to change the air in the pleural cavity so as to be able to see what he is doing. There is also considerable difficulty in retaining the cautery at the correct heat, and to prevent it getting caught by the charring of the tissues. The same complications as those mentioned above may follow on this method of division.

An adhesion which is not accessible for division by tenotomy can be exposed by opening the chest and obtaining direct access to it. This is of course a more serious undertaking, but is quite justifiable when collapse of the lung is essential in the treatment, and is seriously interfered with by a band. It is the method also which may be required when the lung has become torn alongside an adhesion in the case of a spontaneous pneumothorax. The opening cannot close because one side of it is held out by the adhesion and the other pushed away by the pressure in the pleural cavity. The opening even may be valve-like in character, giving rise

to an ingravescent pneumothorax.* Such an accident may be further complicated by an effusion, at first simple but later infected by tubercle bacilli, by secondary organisms, or by both.

The thorax is opened as near to the adhesion as possible by an incision along an intercostal space, the tissues having been anaesthetized by novocain. The ribs on either side are strongly retracted and the adhesion exposed and divided. The wound is then closed, care being taken to secure approximation of the parietal pleura. Should an effusion form after this it is advisable that the patient be placed so that the fluid does not come into contact with the wound. If the fluid is excessive it should be aspirated and replaced by oxygen.

There is one other matter in connexion with adhesions that requires mention. The base of the lung is not infrequently adherent either to the summit of the dome of the diaphragm or to the mesial part of the corresponding half of the muscle. Occasionally it happens that before the intrapleural pressure has been raised sufficiently to collapse the non-adherent part of the lung, the pull on the diaphragm causes distress to the patient, who may suffer from pain and an incessant dry irritating cough; also, if the collapse is on the left side, from vomiting as well. So persistent may these symptoms be, that either the pneumothorax must be abandoned or the diaphragm paralysed by dividing the phrenic nerve in the neck. This will cause complete relief and allow of greater compression of the base of the lung. It must be remembered, however, that the motor fibres to the diaphragm may enter the phrenic nerve through the nerve to the subclavius muscle. In such cases section of the phrenic in the neck is followed by no change in the diaphragm.

Extrapleural collapse of the lung is of value in certain types of cases only. When the disease is localized to one upper lobe and is resistant to treatment, or is advanced and is associated with secondary changes or a cavity, or is causing repeated haemorrhages, then if pneumothorax has been tried and been found to be impossible, local collapse of that lobe can be obtained by displacing the lung, together with the parietal pleura. Such displacement cannot satisfactorily be produced by gas, as there is no sac into which to inject it, and it is too rapidly absorbed by or dispersed through the cellular tissues from which the pleura has been stripped. The displacement has therefore to be maintained by some solid substance, such as paraffin wax or fat.

If the patient has plenty of fat to spare, this is the most satisfactory substance to use, as it is non-irritating and is sufficiently fluid to accommodate itself to the shape of the space into which it is packed.† Failing this, paraffin can be used, but it has the great disadvantage of being in some cases very irritating and of causing an extrapleural serous effusion, which, unless successfully tapped, will distend the wound, discharge through it, and in doing so carry away the paraffin with it. Moreover, when this happens there is the risk that the cavity will become infected.

The whole operation can be done under local and regional anaesthesia or under local anaesthesia with a little chloroform while the upper part of the parietal pleura is being stripped. An incision is made either over the anterior part of the second rib, part of which is removed, or through the anterior part of the second interspace when the ribs are not too closely approximated. The incision is carried down to the parietal pleura, which is carefully stripped away from the overlying tissues up to the apex, and in front and behind, until it is freed over the whole of the upper lobe. When this has been done it will be found that there is a partial collapse of the upper lobe carrying the pleura with it, the collapse increasing during inspiration and decreasing during expiration, whilst a cough will force the lung completely out again. The lung is kept displaced by a copper retractor, and into the space thus formed is put either a mass of fat from the abdomen of the patient or the paraffin. This latter should have a melting point of about 112° F., and be just sufficiently hot to be in a fluid state. It is most important that the patient should not cough from this moment until the wound is firmly closed, as otherwise the paraffin will be forced out and an indifferent collapse obtained. In suturing the wound the closest approximation of the edges must be secured.

Collapse of the lung, together with the chest wall, is a more serious operation and the change obtained is permanent. It is not an operation to advise until all other means have failed, and then only if the conditions and chances are favourable. The class of case for which it is suitable is more limited, and the contraindications are more numerous and more rigid. It is an operation directed to the treatment not so much of the tuberculous lesion as of the secondary complications of that disease. It is of value not for the acute active case but for the patient with long-standing chronic phthisis. Active disease must be, as far as is ascertainable, limited to the one lung, but the presence of a small amount of fibrosis in the other lung is not necessarily a deterrent.

There are two methods by which the lung and chest wall can be collapsed. It can be done either by rib mobilization or by rib resection. Until lately I have been a strong advocate of the former in preference to the latter, as I thought that the resection method was excessively severe. Recent experience has, however, now converted me to this one in preference to rib mobilization. Rib mobilization means two fairly big operations, and the patient is confined to bed usually for a couple of months. Rib resection means one severe operation only and a very much shorter time in bed. The results in both cases are equally good provided collapse of the apex is not essential.

In the operation of rib mobilization collapse is obtained by resecting portions of the posterior ends of the first nine or ten ribs at the first stage, and of the costal cartilages of the fixed ribs together with a wide section of the costal margin at the second stage. The resection of the portions of the first rib is extremely difficult, but unless this is done the result will be disappointing, as the falling down and in of all the other ribs depends very largely on the freedom of the first. As the result of this detachment of the ribs from their posterior and anterior points of fixation and support they drop downwards, they fall inwards, and they tilt downwards and inwards (bucket-handle action). By this change in position they diminish greatly the size of that half of the chest and collapse the lung to about one-third its original size in an adult, and even more so in a child.

The operation of rib resection is done through a single vertical incision extending from the apex of the axilla to beyond the eighth or ninth rib. It is done under a general anaesthetic (chloroform), but immediately before this is started I try to inject each of the first nine intercostal nerves with 5 minims of absolute alcohol close to the angle of the ribs. Even if one does not strike every nerve the shock is considerably diminished and so also is the after-pain.

The ribs having been exposed the periosteum is stripped off each in turn, starting with the fourth or fifth and working first upwards, up to and including the second, and then downwards to the eighth or ninth. The ribs are freed in front as far as the costo-chondral junction and behind to the angle. Each rib as it is freed is divided in the middle, the anterior half is bent forwards and will break off at its junction with the cartilage. The posterior half is then bent back and may snap at the angle. If it will not break as desired, curved bone forceps must be slid down the bone and the rib cut through as far back as possible. It is not feasible to reach the first rib through this incision, but the collapse of the lung and of the chest wall is not, in this operation, dependent on the freeing of it. In most cases sufficient collapse of the upper lobe will be obtained without it, but if it is necessary to get complete collapse of the apex (because, for instance, of a cavity) the first rib must be resected through a separate incision below the clavicle.

The wound is completely closed except for a drainage tube, which is left in for twenty-four hours. It must be remembered that the external surface of the pleura will secrete a serous effusion as well as the inner.

The deformity of the chest is considerable, the whole of the anterior and external aspect, and to a less extent the postero-external aspect, sinking right in. This, however, is not visible when the clothes are on, as these hang from the shoulder, which has been in no way affected.

I have done two cases in the last six weeks and neither of these has had any shock sufficient to give the least anxiety. In the second case, from whom I removed six ribs only, the total amount of bone taken away was almost 3 ft. 6 in. in length when the ribs were placed end to end. Both were up within a fortnight—the second on the tenth day—and the temperature was normal after the third day.

* The "Spannungs-pneumothorax" of the Germans, in which air enters the pleural cavity from the lung with each inspiration, but cannot escape during expiration.

† On the Continent omentum, lipomata, and fibroids are kept in cold storage, after removal from one patient, in readiness for another.

DAMAGED LUNGS AND BRONCHIECTASIS.

BY

CLIVE RIVIERE, M.D.LOND., F.R.C.P.,

PHYSICIAN TO CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST AND TO EAST LONDON HOSPITAL FOR CHILDREN, SHADWELL.

VERY commonly does it happen that some amount of permanent damage remains as the sequel to an inflammation, of whatever causation, in the pulmonary area; and the more severe and prolonged the attack the greater, as a rule, the disability. Lung tissue, air tubes, and pleura alike may be implicated in different degrees, the end-results showing themselves in fibroid lung, or simple bronchiectasis, or more commonly some combination of both these conditions. Such gross lesions as follow the textbook account under these headings are readily recognized and need no recapitulation. What I would here emphasize is the common occurrence of slighter degrees of damage, readily overlooked, but often the explanation of anomalous signs and symptoms at some later period. Mistaken as a rule for pulmonary tubercle, they present a ready pitfall, unless recognized, in the realms of diagnosis, prognosis, and also of therapy, for they are very amenable to well directed treatment. "Damaged lung" is the somewhat loose term that best covers, to my mind, the varied mixture of mild fibrosis and dilated bronchial tubes with which I am here dealing, but it is, of course, the bronchiectasis that counts—or rather "bronchiolectasis," for it is the small tubes which are generally implicated in these cases. It will be most convenient to consider the subject under separate headings in children and in adults, but it is in the early years of life that the majority of all cases originate.

In Childhood.

Many years ago I collected[1] some 40 cases of pulmonary fibrosis and bronchiectasis in childhood for purposes of study and analysis. These, which included slighter cases of similar etiology, showed clearly the common origin of lung damage from the inflammatory lung diseases of childhood, particularly in association with the infective catarrhs of measles and whooping-cough. It is interesting in this connexion that American investigators have recently associated a definite thickening of *x* ray lung shadows after these two diseases. But bronchopneumonia stands out in childhood as the prime causation of lung damage, and this is found clinically at the bases of both lower lobes.

	Cases.
Bronchopneumonia—	
Simple	6
With whooping-cough...	5
With measles	3
	—14
Bronchitis—	
Simple	6
With whooping-cough...	3
With diphtheria	2
With measles and whooping-cough	2
	—13
Lobar pneumonia	4
Congenital atelectasis	2
	33

To these I should add, with further experience, two other causes in childhood—influenzal pneumonia and tuberculosis. Influenzal pneumonia leads very readily, as in adults, to fibrosis and bronchiectasis, and I have seen several cases which well illustrate this fact. The lung damage left after tuberculosis in early childhood will be an object of scepticism to many who still hold desperate views as to the mortality of the disease at this age period. The *x* rays have long convinced me of the recoverability of pulmonary tuberculosis even in infancy, and in such cases some signs of lung damage generally remain behind.

Let us now consider some common types of "damaged lung" in childhood.

First, there is the case in which the condition may be seen to develop after bronchopneumonia. The signs at the bases of the lungs, percussion impairment, and crepitations do not completely clear up after the child appears otherwise well and vigorous. A not uncommon sequel is a further attack, which may appear to be bronchopneumonia, but is somewhat milder than the original attack or than the usual course (very varied, by the way) of this affection. Sometimes repeated attacks supervene, and it is always wise when a case of bronchopneumonia is seen for the first time to inquire for former similar illness. A history of this, the mild course of the illness in some cases, occasionally a slight clubbing of the nails also, may help us to suspect that an attack is occurring on the top of lungs already "damaged." These further attacks may amount to a mere acute catarrh of the dilated bronchioles, with some "congestion" of the surrounding lung, but no true pneumonic consolidation. In other cases a fresh bronchopneumonia occurs; the physical signs are very similar in both cases.

The second commonest simulation of "damaged lungs" in childhood is of pulmonary tuberculosis. Most of the cases are basal, and then the mistake is less likely to arise; but when a coughing child presents an area of impairment and crepitations at an apex, commonly the right, it is no wonder if he gets treatment for pulmonary tuberculosis sometimes for years on end. Only recently two such cases, which had been under prolonged treatment, were sent to me by a tuberculosis officer in the London district for comment and discussion. Such cases originate, I think, in apical lobar pneumonia, the right apex being the second commonest situation of the lesion in this disease in childhood (the left base being the commonest). The children are much less ill (often not ill at all) than they would be with tuberculous lesions of similar extent, and the history and course, if other points fail, should suffice to make clear their nature. The physical signs of a "damaged lung" in childhood necessarily vary with the case. Where there is much fibrosis this is indicated by marked dullness, feeble breath sounds, often with diminution of vocal vibration, and by contraction of the diseased area. Where bronchiectasis involves the larger bronchi, no added sounds may be audible or a few coarse râles are heard. It is where the smaller bronchial tubes, and these near the surface, are affected that the more typical signs—breezy consonating crepitations, sounding very superficial—are heard. In many cases these sounds may simulate pleural friction. Typically, as occurring after a protracted bronchopneumonia, they closely simulate, both in nature and in distribution, the physical signs found in this disease—the symptoms of illness disappear but the signs remain! When a lung from such a case can be viewed on the *post-mortem* table it shows a reticulated appearance from the development of numerous bronchiolar sacs.

Now the failure of bronchopneumonic signs to clear is no uncommon occurrence; many such cases of bronchiolectasis leave our children's hospitals, and it may well be asked what becomes of them. Some may, perhaps, be still recoverable; some, we have seen, return with recrudescences of catarrh; but there are others whose health does not appear to be prejudiced but who yet retain some damage to their lung bases and carry this presumably into adult life—where we shall meet them again farther on in this paper.

As to the symptoms of "damaged lungs" in children, these will depend on the amount and nature of the bronchiectasis. Some will have cough and nothing to show for it; others will bring up sputum, and occasionally blood, in varying quantities. But few appear to be really ill or toxic in their early years, apart from the severe febrile lung attacks to which a proportion of them are prone. The sallow skin, with wasting and foul sputum characteristic of bad cases of adult bronchiectasis, are much less common in childhood.

In Adult Life.

"Damaged lungs" in adult life are very commonly the inheritance of inflammatory diseases in childhood. Not to speak of marked and typical cases, we may meet with the conditions to which I would draw attention under very different circumstances.

First, there are cases where a "basal bronchitis," strictly confined to the broncho-pneumonic area, is found—generally as a chronic condition with exacerbations. My belief that these are cases of bronchiolectasis derived from a childhood bronchopneumonia is a mere pious opinion. I have no real proof to offer. May not they represent a proportion of those cases of unresolved bronchopneumonias which retained their damage with but little immediate ill health? The history of certain of them suggests that this is so. More likely still is this the case in many cases of so-called bronchopneumonia, apart from influenza, in adults. Influenzal bronchopneumonia must of course be given its due place, but I am myself doubtful of most of the so-called bronchopneumonias of other causation in adult life. In many such cases the signs and symptoms are much more suggestive of a severe catarrh in an old basal bronchiolectasis, and in such cases the signs will not completely clear up after the attack. They may, however, be slight and easily overlooked in the quiescent state,

where the dilated tubes are not close to the surface (this is illustrated by experience of less debatable cases in childhood). If a careful history of such a case is taken, with the assistance of an elder relative, a clear record of bronchopneumonia, sometimes repeated, in early life is not infrequently obtained.

It has already been mentioned in dealing with bronchiectasis in childhood that blood is not infrequently coughed up, and that, occasionally, in notable amount. This may occur in adult life also, and I have known it to occur in a patient who had lost all recollection of former chest disease, but who presented a well marked basal bronchiolectasis, of which his female relatives were able to supply a perfectly clear account from his early childhood. The case was, of course, under dire suspicion of pulmonary tubercle.

In addition to damage from childhood infections, the lungs of adults are also very apt to suffer scarring from the results of recovered influenzal pneumonia and of tuberculosis. Basal bronchiectasis or bronchiolectasis, not infrequently double, is not uncommonly to be seen since the recent epidemics. Sometimes it gets forgotten until some acute exacerbation brings it once more to the notice of the medical attendant. Occasionally it has been so far overlooked that some fresh disease, generally tuberculosis, comes under suspicion when new symptoms arise.

The lung damage caused by the healing of tuberculous lesions is so large and varied a subject that I shall not attempt to touch more than one aspect of it here. I would only urge that some amount of bronchiectasis is the usual accompaniment of chronic tuberculous lung disease. The point I wish to call attention to is the presence of crepitations over the diseased areas in cases of arrested or healed pulmonary tuberculosis. Such an occurrence is not uncommon, and yet one finds but little reference to it in the literature. I have many cases under observation which have been long arrested, but where crepitations remain, and might cause anxiety in the mind of an uninitiated observer. In some of these cases there are but the dry crackles of expanding lung, but in others the crepitations are somewhat moist and are due, I feel sure, to dilated bronchioles over a contracting fibroid area—generally in the region of a deep contracting cavity. The diagnosis of "arrest" may be difficult where these are present—it is greatly helped, in my experience, by the absence, in these cases, of the "reflex bands of percussion impairment" which I have described elsewhere on more than one occasion.

In conclusion, I should like to insist on the point, which perhaps I have hitherto only implied, that fibrosis and bronchiectasis, and "damaged lung" in general, vary according to the severity of the inflammation which produced the condition. It is attention to the slighter grades for which I here plead—the textbook account of bronchiectasis applies to the few marked and uncommon cases, whereas the slighter forms are not rare and are seen at all ages. They do not provide us with "pints of fetid sputum which separates into three layers," but they provide us with a varying symptomatology, and with problems in diagnosis, prognosis, and treatment, which may be of vital importance to our patients, and not without moment to our own *amour propre*, and, incidentally, our reputation.

REFERENCE.

[1] *St. Bartholomew's Hospital Reports*, 1905.

AN UNUSUAL CASE OF TYPHOID SPINE WITH SYMPTOMS OF SPINAL CORD AFFECTION.

BY

PROFESSOR H. TURNER,

ORTHOPAEDIC CLINIC OF THE MILITARY ACADEMY OF MEDICINE, PETROGRAD.

NUMEROUS clinical observations and pathological research of past years have brought convincing evidence of the fact that the infective agent of so-called acute internal disease may settle on different parts of the skeleton, bringing injuries to bone, cartilage, or component parts of the joints (Virchow, Rokitansky, Ponfick). It is well known that even such exclusively internal diseases as influenza may involve the osseous tissue. The "amphibious" qualities of the pneumococcus are proved by every day's observation. Its nefarious rôle in the production of osteomyelitis and arthritis has been very often the cause of diagnostic errors. The ranks of specific "surgical" microbes, as primarily defined by Ogston, W. Cheyne, Rosenbach, and others, have been gradually enlarged by the enlistment of many other pathogenic elements, which have come forward from the domain of acute infectious diseases such as those belonging to the multifarious group of typhus—that is, typhoid, recurrent, and typhus (spotted) fever. The widespread epidemic of these latter diseases observed in Russia during recent years has given birth to vast material concerning this subject, and Russian literature, notwithstanding external difficulties, has been able to bring abundant illustration of the surgical complications of typhus fever in general. Typhoid or enteric fever, with its stubborn bacteria, capable of retaining vitality in the organism for many years after the conclusion of morbid symptoms, stood foremost in this relation, although recurrent and spotted fever did not remain much behind in showing the same quality. Clinical observations on a large scale gave us the opportunity of confirming the findings of Ebermeyer, Fränkel, Quincke, and many others, who discovered typhoid bacilli in the vertebrae, ribs, sternum, and other bones of the dead body.

The special tendency of the spine to become the seat of infection, as explained by Fränkel's demonstrations of living typhoid bacilli in the cancellous tissue of the vertebral body, we have seen represented in the numerous cases of typhoid spine which came under our observation in the orthopaedic hospital of the Medical Academy. Experience has taught us to mark off these forms of spondylitis amidst the greater number of tuberculous cases, and generally there was not much difficulty in avoiding errors of diagnosis.

The involvement of the spine in the typhoid process takes place, with great probability, during the flourishing period of the disease, and must be of not very rare occurrence. The symptoms of this complication may pass unremarked on the background of the grave picture of the illness. A new wave of temperature, accompanied by severe pains in the back, may draw attention to the intrusion of the virus into the spine. The further progress of the complication may be very slow, not taking a malignant course. It seems as if bone tissue, especially the cancellous part of it, is not a suitable pasture for the typhoid microbe, the feeble pyogenic and destructive character of which has been proved by many communications. The symptoms of the infection may in some cases subside without having been clearly understood, natural curative forces having extinguished its continuance. But as in other parts of the body, and especially in the intestinal channel, the virus of typhoid fever, secluded in the vertebrae, may retain its vitality for months and years, only to regain force under convenient circumstances, trauma in any form being the auxiliary agent.

It may be stated that the pathological anatomy of typhoid spine in the different stages of its development is not founded on such abundant data as in the case of Pott's disease. The benign course of typhoid spondylitis allows the patients to evade further clinical observation, and the final changes in the vertebrae have to be studied on occasional findings in the anatomical theatre or on the shelves of museums. The examination of these specimens, and the interpretation of the pathological changes presented by them, are hampered by the want of clinical notes. It is not easy, therefore, to define clearly the type of typhoid or other infectious spondylitis among the multifarious pathological processes to which the spine is so conspicuously liable. Roentgen rays have done very much to help our advance in this difficult field. The findings seen on the plate, elucidating the origin of clinical symptoms, present themselves as useful guides in the examination of dry pathological specimens. Taking this course of study, I have been able to discern with a great degree of positiveness the doubtful cases of infectious spondylitis compiled by me in the surgical museum attached to my clinic. The general impression received from the examination tends to confirm the supposition that the process of typhoid spondylitis is actually a form of subacute inflammation involving the periosteum, ligaments, and vertebral articulations. Gibney's term, "perispondylitis," remains the most suitable for a brief determination of the pathological changes. The posterior lateral parts of the laminae are principally involved, their mobility probably influencing the exacerbation of the process.

This point of view may help to explain the frequent localization of the illness in the lower dorsal and upper lumbar regions. Ossification of the tissues adjacent to the bone brings firm consolidation of the laminae and locking of the joints. The massive layers of newly formed bone on the

outer surface of the posterior wall of the spinal channel are sometimes exceedingly imposing. Continuous or interrupted bridges are to be seen between the vertebral bodies. The intervertebral discs seem to undergo a process of atrophy, the intervals between the adjacent surfaces of the bodies becoming narrower. In some cases there is to be seen complete synostosis of laminae, articulations, and bodies. Two or more vertebral bodies become firmly and inseparably united. One of my specimens coming from a juvenile subject clearly represents the result. The vertebrae have been united in three pairs, beginning from the lower lumbar and ending by the twelfth dorsal. The next three dorsal vertebrae (9–11) are also firmly glued together, showing traces of heavy destruction of the bodies. And yet there is no kyphotic curve of the spinal process line. The fact of the vertebral bodies having been impaired in this case emphasizes the common assumption that the anterior cancellous part of the column may not be exempt from the destruction. It seems to confirm the investigations of E. Fränkel, who was able to cultivate typhoid bacilli procured from bone marrow squeezed out of the spongy tissue of the vertebrae after death. The paradoxical absence of kyphosis in such cases is easily explained by the effect of previous ankylosing periostitis binding together the posterior halves of the laminae and locking the articulations. The same interpretation may be accepted for the rare occurrence of grave spinal cord symptoms in typhoid affections; paralysis from cord compression is not spoken of.

The picture of typhoid spondylitis as represented by the Roentgen plates is very characteristic. Attention is drawn to the narrowing or partial disappearance of the intervertebral spaces and to the lateral protrusion of the contiguous edges of the bodies. Dense vertical shades on one or both sides of the middle line reproduce the massive bridges of newly formed bone by which the posterior parts of the column are soldered together. A scoliotic curve may be occasionally seen as the result of asymmetrical disposition of the disease.

As regards the clinical symptoms of infectious spondylitis, it may be said that they differ very much from those in Pott's disease. Acute excruciating pain in the back is the chief complaint. Every least movement exaggerates the sufferings; the undulations of a spring mattress may bring them on. The exact situation of the process may be easily determined by manual examination, although kyphotic projection may be absent. Digital pressure reveals intense pain in the lateral parts of the spine. The soft coverings of the region involved may be thickened and oedematous. In some cases several foci of the disease are to be found in different levels of the spine. Fever of an intermittent type generally accompanies the process in its initial stage. Tendency to suppuration or the formation of fistulae is very rarely observed, the diagnosis thereby being deprived of bacteriological proof. According to our clinical experience and the bacteriological findings of Quincke, E. Fränkel, and others, one must allow the assumption that the involvement of the spine in the typhoid process is a frequent integrant part of the disease as a whole, the infection continuing to exist in a latent state. The awakening of the process is generally brought about by trauma, be it in the form of an early attempt to leave the bed or to resume physical work. Therein lies the explanation of the development of typhoid spondylitis some months or even years after recovery from the initial disease. The symptoms and clinical course of spondylitis produced by spotted or recurrent fever are similar to those above described.

The following case may be offered as an interesting addition to the general statistics of the subject:

L. M., aged 23, Red Army, infantry, admitted to the orthopaedic department May 21st, 1921. In November, 1919, he developed typhoid. In February, 1920, he began to suffer from pains in the back. Having re-entered service on August 12th after two months' leave he continued feeling the same pains. In December, 1920, he went through an attack of recurrent fever. Called up again soon after, he began to lose power in his legs in March, 1921. After a certain term of treatment in a military hospital he came under my care.

On admission his state was as follows: General health good. Robust complexion. Standing or walking absolutely impossible. Distinct signs of partial spinal cord compression in the form of ankle and patella clonus; Babinski's phenomenon; rigidity of muscles and weakness of the lower limbs; loss of muscular feeling in the toes; skin hyperaesthesia to pain on the level of the seventh to eighth dorsal segments, and hyperaesthesia to all kinds of sensation lower down. State of atactic paresis of the lower limbs. No trouble of the bladder or rectum. Examination of the spine shows a not clearly defined swelling between the shoulder blades corresponding to the fifth to seventh spinous processes. The integuments of the same region oedematous and reddened. Fluctuation distinct. Palpation of the diseased area of the spine inflicts great pain, especially in the lateral parts of the vertebrae. Vidal's reaction of the blood positive. Temperature between 38° and 39° C.

Patient complains of great pain in the back, especially with every movement. On opening the abscess under general anaesthesia, on May 25th, slightly odorous grey-green pus was found, from which a pure culture of typhoid bacilli was obtained in the bacteriological laboratory of the Academy. There was no doubt about the identification of the micro-organism, as it showed all the usual tests. The cavity of the abscess was found to be located to the right of the spinous processes, leading deeply towards the corresponding laminae. No denuded bone could be felt during the scooping out of its contents.

The subsequent course of the case was favourable, although of long duration, spinal cord symptoms subsiding very slowly. The fistula, periodically closing and reopening, continued to produce pus containing the specific bacteria. Voluntary movements of the legs reappeared in July. The hyperaesthesia disappeared. Babinski's sign and clonus still persisted. By December, 1921, the patient was able to walk freely. At times he felt acute pains in the region of the operation. A probe periodically introduced into the fistula met with something hard resembling denuded bone. The attempts to extract the "sequestrum" were futile, although it seemed to be movable. On June 2nd chloroform was administered and the fistula cut open. With a strong forceps I extracted a foreign body, which proved to be the middle part of a penknife blade about 1½ cm. square, thus astonishing my staff and myself. The patient being eager, still in a drowsy condition, to see the obnoxious bone which had troubled him for so long, the piece of metal was shown to him. His look seemed to wander as if trying to recollect some distant event. "Yes," said he, after a pause, "there has been an affair." The details of the adventure were obtained on the next morning. In the winter of 1918, before he entered service, he took part in a sleigh trip in company of his equals containing representatives of his parish. Having the advantage of being able to play the harmonica, he was stabbed from behind by a jealous village comrade. The blade of the penknife broke into pieces on striking the vertebral laminae; its point probably penetrated the cortical layer of the bone and broke off. The small wound healed without any further trouble in a few days, and no subsequent attention was paid to the tragic event.

In need of a justification of my publishing the above case, I may point to the fact that it is the only positive one, according to my knowledge, in which typhoid spondylitis was complicated by suppuration. The bacteriological verification of the origin of the disease is also of singular interest. The previous trauma, which may have stimulated the onset of the suppuration, is also to be underlined. Symptoms of cord affection are a not very frequent concomitant in typhoid spondylitis.

The wound having healed in two weeks, the patient walked out of the clinic on June 29th, 1922, with some traces of nervous disorder in his legs.

TREATMENT BY DIATHERMY.*

BY

W. J. TURRELL, M.A., M.D.OXON.,

ELECTROTHERAPEUTIC PHYSICIAN, RADCLIFFE INFIRMARY, OXFORD.

THE title of this communication does not necessarily imply the adoption of any electrical method. It simply refers to treatment by penetrating heat. The subject consequently admits of division into two parts: (1) the therapeutic effects of heat penetration; (2) the most effective method of securing this penetration, having due regard to its safety, the ease of its regulation, and its capability of application to the body as a whole or any organ or part of the body.

As to the first part there can, I think, be no difference of opinion in regard to the great importance of heat as a therapeutic agent. Its value has, in fact, been admitted from the earliest times to which medical history extends, and probably no method of therapy has been more unquestionably or more universally adopted.

A variety of methods have been utilized for applying heat treatment—hot sand, hot bricks, poultices, radiant-heat baths, sun baths, paraffin baths, and many others too numerous to mention; but the therapeutic value of all these methods is distinctly and definitely limited, for the simple reason that their action is restricted to the surface of the body and the superficial tissues, and cannot be brought to bear directly upon the deeper organs and structures. They are consequently useless as agents for treatment by diathermy or heat penetration.

There is only one known method by which heat can be

* A paper read at the annual meeting of the Oxford and Reading Branch of the British Medical Association, July 13th, 1922.

directly applied throughout the body as a whole or concentrated on any limb, on any organ or part of the body, and this is by the electrical method commonly known as diathermy, the outcome of the research of the distinguished French physicist d'Arsonval.

Mode of Action.

This fact well illustrates a very important point in relation to electrical treatment. In the past electrotherapy has been regarded by many patients, and, indeed, by some medical men, as an empirical and mysterious form of treatment passing all human understanding. In reality it is nothing of the kind; its value, on the contrary, rests upon the fact that it is often the best means by which some well established method of treatment can be carried out; as in the present instance, it is the most effective method of administering heat; in other cases it is the best method of producing muscular exercise, localized or general; or again, it may be the best means of effecting chemical or other changes in the tissues. I will endeavour, as simply and as briefly as I can, to explain in what manner this heat penetration is electrically obtained.

An electrical current may be in the form of what is termed a constant current—that is to say, a current which is maintained at a uniform strength, flowing in the same direction without interruption, reversal, or variation; such is the direct current, the D.C. of commerce. Or, on the other hand, it may be interrupted and its direction reversed at each interruption, as in the alternating current, the A.C. of commerce, with its usual periodicity of about fifty reversals a second.

Provided that the constant current is applied to the body very gradually no muscular contraction will be excited, but during the whole of its passage an acid such as HCl will be formed on the skin at the positive pole by what is termed electrolytic action, and an alkali such as caustic soda will be similarly formed at the negative pole. With the small constant currents usually applied in electrotherapy these phenomena will produce no bad results; but if a very strong current is applied these products will cause serious burns of the skin or subcutaneous tissues; the amount of current which can be safely applied is therefore insufficient to produce any very marked heating effects.

On the other hand, in the case of the alternating current, changing its polarity from positive to negative fifty times a second, the danger of such burning is absent as the alternating products neutralize one another. But at each sudden make or reversal of the current strong and painful muscular contractions are excited, and if a very strong current was employed the effects might even result in the death of the patient.

In 1888 d'Arsonval found that by increasing the number of the interruptions a second of a current at a given strength, the resulting contractions became more vigorous as the interruptions became more frequent; until a rate of interruption of from 2,500 to 5,000 a second was reached, when a further increase in the frequency resulted in a diminished vigour of the contractions. In December, 1898, using the apparatus of Hertz, d'Arsonval attained a frequency of interruption or oscillation of about a million a second, with the result that all contractions and sensation were abolished, and only the heat generated by the friction resulting from the oscillation of the electrical particles (the ions conveying the current) remained. This constituted the discovery of high-frequency currents, and by subsequent improvements in the apparatus the frequency of the oscillations was further increased, yielding the diathermic currents of d'Arsonval.

I will merely state that in its main principles the apparatus is identical with the transmitting apparatus of wireless telegraphy, and it admits of the passage through the body with perfect safety of currents of 2 or 3 ampères—that is to say, a hundred times or more stronger than could be transmitted by the continuous or alternating currents. The only effect of the transmission of such currents through the body, apart from a probable stimulation of the tissue cells due to the perturbation excited by these oscillations, is the generation of heat of any desired amount within any organ of the body. According to the density of the diathermy current employed, this method of heat penetration may be utilized for either medical or surgical purposes.

When a diathermy current of moderate intensity is applied transversely through large areas of the body, or longitudinally through the limbs, the temperature of the body at first rises to about one degree above normal, and the pulse becomes accelerated about 10 beats a minute; then, as the heat-regulating centres come into play, the pulse becomes softer and fuller, the temperature returns to normal and will remain normal for the rest of the treatment, although it may be continued for an hour or more at the same intensity. By passing very large currents such as 17 ampères and over through the body a marked rise of the general temperature can be obtained, and if such currents are continuously administered for a considerable time, as has been done in experiments on animals, the action of the heat-regulating centres will be overcome, and the animals will die of hyperpyrexia.

A very small current, such as 300 ma., does not appear to call the heat-regulating centres into action to a relatively marked extent, and consequently with small currents a relatively greater heating effect may be obtained. Thus it has been shown that on heating the stomach by a diathermy current of 300 ma. the temperature of that organ was raised to half a degree above normal, but, on increasing the current to ten times that strength, the temperature of that organ fell to only one-third of a degree above normal.

Medical Applications.

The importance of these experiments is that they show the immediate and consecutive effects of diathermy. The first effect is to raise the temperature of the part treated; the later effects are a relaxation of the tissues, a dilatation of the blood vessels, and consequently an increased blood supply to the part treated. In this way the therapeutic effects of diathermy are explained—namely, the lowering of the blood pressure, the relaxation of spasm with the relief of pain, and an improved nutrition of parts whose blood supply has been deficient.

Without attempting to formulate any new theory of pain, I should like to recall the intimate and causal relationship which exists between pressure and pain; it is by relieving spasm and pressure, and hence removing pain, that diathermy finds one of its most important indications in clinical practice. Neuritis, deep-seated pain such as that associated with dysmenorrhoea or the spasm of a ureter excited by the passage of a calculus, the hypertonicity of the lumbar muscles in lumbago or the neck muscles in torticollis, the muscular rigidity of local tetanus, the pain and tenderness of a recently strained ankle, and many other conditions too numerous to enumerate, are usually markedly relieved and often permanently cured by the application of this treatment.

The nutritional effect of the increased blood supply induced by diathermy is constantly seen in the improvement which takes place in wasted limbs and atrophic conditions treated by this method.

Hypothermic and marasmic conditions are much relieved and improved by generalized diathermy. Bergonié has advanced the ingenious theory that its administration in these cases affords what he terms a "supplementary ration of heat"—that is to say, he maintains that, as the greater part of the food taken is diverted to the maintenance of the body temperature, if heat is furnished to the body by diathermy the food previously diverted for this purpose would be utilized for the nourishment and building up of the tissues. Bergonié further points out that the custom of giving additional food, owing to the weakened digestive mechanism associated with these marasmic cases, merely serves to add the troubles of indigestion to those already existing. Bergonié has published several cases in proof of his contention; moreover, the theory would appear to receive some support from the improved nutrition of rickety children exposed to the prolonged action of the sun bath; for such improvement may be partly due to the gradual action of the heat rays from the sun and partly due to the action of its actinic rays.

When we realize the very wide application of heat therapy it is not surprising to find that diathermy is continually extending its sphere of action. To mention only a few of the recently adopted indications, Professor Bordier, in the excellent and exhaustive volume on diathermy which he has recently published, draws attention to the great benefits attending the adoption of this treatment in certain cases of dyspepsia, and quotes a number of cases investigated by Setzu to show how it increases both the total gastric output of acids and of free hydrochloric acid. Setzu's carefully investigated cases definitely show how the secretion of a deeply seated organ may be increased by the administration of penetrating heat, and suggest a wide field for research on the effect of diathermy on ductless glands whose secretion has become deficient.

The special vulnerability of gonococci to high temperatures renders possible their destruction, or an impairment of their vitality, at temperatures obtainable from diathermy and readily supportable by the tissues, and thus renders this treatment a specific in gonorrhoea and most of its complications. Many other conditions, such as asthma and unresolved pneumonic consolidation, will suggest themselves as especially suitable for gradual and prolonged diathermic treatment at low intensities, but time forbids me to deal further with the medical aspects of diathermy and I must pass on to its surgical side.

Surgical Applications.

In surgical diathermy the heat, which in the medical applications is distributed over a comparatively large area, is concentrated on one spot. It differs from the destruction of tissue by heated irons or the Paquelin cautery in that

when properly applied it effects the destruction by heat coagulation and not by charring or incineration.

Those who have used the Paquelin cautery will remember how the charred tissues adhere to the blade of the instrument and become separated from the heated surface of the part treated, so laying open a bleeding surface. In surgical diathermy the instrument utilized is not itself heated, the whole of the heat being developed in the part treated; it consequently does not adhere to the tissues but comes cleanly away, leaving them undisturbed but firmly coagulated to a sufficient depth to prevent haemorrhage.

It is not claimed that surgical diathermy is an absolutely fool-proof method, for if it is applied incautiously in the neighbourhood of large vessels the wall of an imperfectly coagulated vessel may be laid open and fatal haemorrhage ensue. Such an occurrence has been recorded by Bordier and others in the destruction of malignant tonsils by diathermy. The risk of haemorrhage from surgical diathermy, if it is applied in a rational manner and with due regard to the anatomical relations of the part treated, is exceedingly small.

The methods of its application are threefold: the unipolar method, utilizing a small active and a large indifferent electrode; the bipolar method, using two small active electrodes; the indirect method, in which the patient, lying on a condenser couch attached to one terminal of the apparatus, and holding an electrode connected with the other terminal, is charged with a suitable diathermic current, which is tapped off to the body of the operator at the point to be destroyed.

For the destruction of most superficial growths, sufficiently removed from important underlying structures, such as large blood vessels, nerves, glandular ducts, etc., *the unipolar method* is usually the most convenient one. It is, however, difficult with this method definitely and accurately to restrict the depth to which the coagulating action of the heat will extend, and in the neighbourhood of important structures it is best to delimit the destructive action of the current by the adoption of *the bipolar method*. In this case two small active electrodes of the same size are applied to the surface of the part to be treated, and the destructive action is limited to a slight and readily recognized depth. The destructive action may, however, be still more effectively controlled by the use of electrodes provided with multiple points of the required length. These electrodes consist of small plates, from the under surface of which several needles project; by plunging each of the instruments, at a suitable distance from one another, into the growth to be destroyed, the action of the current reaches with certainty to the desired depth, and cannot extend more deeply.

The indirect method, which I introduced some years ago, is especially suitable for the treatment of small growths, naevi, papillomata, warts, urethral carunc'es, epulides, etc. The advantages are that it is the most accurate method and the least painful; the instrument held by the operator is unencumbered with any wires, and as the amount of the current employed is registered by the amperemeter of the apparatus before the treatment is started, the amount of current can be suitably adjusted before the operation is commenced. If with the patient charged in the manner described a papilloma or other growth with a narrow pedicle be held by the operator by means of metal forceps, the narrow base of the pedicle will coagulate and the growth will painlessly separate.

Intravesical growths, haemorrhoids, superficial growths, malignant or otherwise, on the surface or within accessible cavities, lupus, moles, enlarged tonsils, naevi, and many other conditions are suitable for surgical diathermy; it is also a most delicate and efficient means of epilation. Speaking from my own experience, my greatest success with surgical diathermy has been in the treatment of haemorrhoids. Intravesical growths are best treated by a surgeon specializing in diseases of the bladder, as the cystoscope is a far more difficult instrument to use than the diathermy instruments; in fact, I am of opinion that all the more severe diathermy operations, such as the destruction of large malignant growths, belong rather to the surgeon than to the electrotherapeutist.

Concluding Remarks.

I have endeavoured to give a brief summary of the therapeutic action of diathermy. It is, of course, impossible to deal adequately with so large and important a subject in so brief a time; indeed, we have by no means as yet fully developed the therapeutic possibilities of heat penetration by electrical means. As Bergonié points out in his introduction to Bordier's book on diathermy, the end of the last and the beginning of the present century have given us the high-frequency currents of d'Arsonval, the *x* rays of Röntgen, the radium emanation of Becquerel and the Curies; but the period which has as yet elapsed since their introduction has proved insufficient to enable us to develop fully their methods of application or even to visualize fully their wide-reaching and revolutionary effects.

Every new discovery in Medicine, whether electrical, pharmaceutical, or surgical, is invariably heralded as an epoch-making discovery, and from its application miraculous results are confidently predicted, which the lapse of time fails to realize. We have in the past, as Bergonié says, seen every illusion flourish and have heard every physical panacea preached. It is only by patiently and critically investigating the clinical action of these new methods and by carefully tracing out their fundamental basis that we are able to establish them upon a sure and lasting foundation. Working upon such lines as these, the modern school of electrotherapeutists, both in this country and abroad, may fairly claim to have placed the high-frequency currents of d'Arsonval upon the firm and far-extending foundation of heat penetration, and upon this basis to have secured for them an important and enduring position among the therapeutic methods of the future.

The FitzPatrick Lectures
ON
THE POST-HIPPOCRATIC SCHOOLS OF MEDICINE.

DELIVERED BEFORE THE ROYAL COLLEGE OF PHYSICIANS OF LONDON,

BY

R. O. MOON, M.D., F.R.C.P.

[*Abstract.*]

In my lectures in 1921 I endeavoured to show how Hippocrates had been influenced by the great Ionian philosophers who had preceded or been contemporary with him, and by the scientific and general intellectual atmosphere in which his writings had been composed.

Just as after the death of Socrates the essential unity of his teaching broke into a variety of schools—such as the Cynics, Cyrenaics, Megarians, and, in particular, the followers of Plato—so after the death of Hippocrates, medicine became split up into a number of sects, each at its best emphasizing some important aspect of medical truth, but each in turn, as is the habit of all sectarianism, running into strange extremes, and remaining incapable of grasping the Hippocratic system as a whole.

The post-Hippocratic schools of medicine, which were four in number—(1) the Dogmatists, (2) the Empirics, (3) the Methodists, (4) the Pneumatists—occupy perhaps a somewhat unimportant sphere in the history of medicine, but the great philosophic schools of the Stoics, Epicureans, Sceptics, and Eclectics which influenced them, and of which, in a sense, they were the practical outcome, are famous through all time, and some attempt will be made to describe them when trying to explain their points of contact with medicine.

THE DOGMATISTS.

The school of the Dogmatists in its prime synchronized with the decline of Hellenic freedom and with the rise of the Macedonian hegemony. This school received its name from Galen, and, though not very happily chosen, it must be retained for convenience. If we were to call them "theorists" we should come nearer to the essential idea which they represented in the ancient world. To the modern mind dogmatism is suggestive of a certain degree of intellectual rigidity and aridity which were certainly not characteristics of this ancient medical school. But they suffered from what Bacon called that first distemper of learning, when men study words and not matter.

The most important member of this school, though not the actual founder of it, was Diocles of Carystus, who flourished soon after the death of Hippocrates. He was born at Carystus in Euboea (400 B.C.). The greater part of his life was passed at Athens, and with pride he was termed by his fellow citizens "a second Hippocrates." He was the first physician to write in Attic Greek, and his writings covered the whole field of medicine—namely, Physiology, Anatomy, Dietetics, Pharmacy, Pathology, Therapeutics, and Prognosis. He was first to isolate pleurisy from pneumonia, declaring that the seat of pneumonia was in the vessels of the lungs.

Speaking generally, in his dietetic writings Diocles adopted

the Hippocratic point of view, and laid down most minute directions for every hour of the day—for the morning walk, for sleeping, for working, for cleaning the teeth, and so forth. But the bond which specially united Diocles with Hippocrates was his recognition of the fundamental teaching of the great physician that it is impossible to understand the nature of the body without knowledge of the Macrocosm, which is so well exemplified in the Hippocratic treatise of airs, waters, and places. In the writings of Diocles, as in those of Hippocrates, we find an effort to bestow a continuous consideration on the climate, seasons, surroundings, and also the life habits of the sick.

Another distinguished member of the school of Dogmatists some sixty years later was Praxagoras of Cos. He was the son of Nicharchus and the teacher of Herophilus, also he was the father of the celebrated poet Theocritus, and the pupil of Diocles. It appears that Praxagoras was the first to discriminate between the arteries and the veins, and to use them for his teaching on the pulse, to which he attached the greatest importance, saying that the pulse in diseased conditions indicates the changes of the vital force. All mental diseases, he thought, originated in the heart; according to him epilepsy was caused by the destruction of the arteries through excess of phlegm. The nerves he seemed to have looked upon as the organs of sensation, but did not distinguish them entirely from the vessels and tendons; their origin he believed to be in the heart—doubtless because Plato had made the heart the seat of sensation. Unfortunately, he confused himself by taking the terminal branches of the arteries for nerves.

The school of the Dogmatists had a peculiar method of treating fever: first they caused a patient suffering from fever to be covered with a large number of clothes in order to produce heat and thirst; as the fever remitted the patient was given cold water to drink with a view to producing a sweat. If this did not come about the patient had to drink salt water, and this caused vomiting. When by one of these methods the fever was brought to an end, the patient was given roast pork and allowed to drink as much wine as he liked.

But the most distinguishing characteristic of the Dogmatists was that they had taken as their guiding motto the saying of Hippocrates that "the physician who is also a philosopher is godlike," and with commendable zeal they proceeded to earn this title by a careful study of the *Timaeus*—the only dialogue in which Plato gives a concise explanation of his notion of the physical world and puts forward some definite anatomical and physiological ideas; but such subjects, we must realize, were certainly not of primary interest to Plato, who was far more concerned with metaphysics and the nature of ultimate Being, and so the dialogue is put into the mouth of a Pythagorean and not of Socrates, who also stood aloof from physical speculation, which in the *Phaedo* he said he had renounced. Plato himself did not attribute any importance to his own guesses at science. He is not absorbed by them as he is by "the Idea of the Good," for he regarded speculation on physics as a rational pastime only. He would have thought it an impiety to rank physics first in the order of knowledge, as that would mean placing the body before the soul. In the dialogue of the *Timaeus* there is much derived from Plato's theory of the universe and applied to man, as there is much in his theory of the universe which is suggested by man. The microcosm of the human body is the lesser image of the macrocosm; the animal, he imagined, acted as a sort of world to the particles of blood which circulate in it. Like Hippocrates, he believed in the *vis medicatrix naturae*, and seems to have thought that physicians were more or less useless; we know that they as well as lawyers were banished from his ideal republic.

Now in trying to form an estimate of the science of the ancient world it is difficult to realize how great a thing it was to have framed a conception, however imperfect it might be, either of the human body as a whole or of the world as a whole. It is very doubtful whether the Egyptians or Babylonians ever formed such conceptions. General notions are notions which are necessary for the discovery of particular facts, the metaphysical for the physical. Before men can observe the world with any profit they must be able to conceive the world—the string is wanted no less than the individual pearls.

There is a passage in the *Laws* of Plato in which he described two kinds of doctors, and in the superior kind, who are the doctors of freemen, we can easily recognize the prototype of the Dogmatist physician. The passage is as follows:

"And did you ever observe that there are two classes of patients in States, slaves and freemen? And the slave doctors run about and come to slaves and wait for them in the dispensaries—practitioners of this sort never talk to their patients individually, or let them talk about their own complaint; the doctor prescribes what he thinks good out of the abundance of his experience, as if he had no manner of doubt, and when he has given his orders, like a tyrant, he rushes off with equal assurance to some other servant who is ill, and so he relieves the master of the house of the care of his invalid slaves. But the other doctor who is a freeman attends and practises upon freemen, and he carries his inquiries far back and goes into the nature of the disorder [this, of course, is very like the method of the Dogmatist]; he enters into discourse with the patient and his friends, and is at once getting information from the sick man and also instructing him as far as he is able, and he will not prescribe for him until he has first convinced him; at last, when he has brought the patient more and more under his persuasive influence and set him on the road to health, he attempts to effect a cure. Now which is the better way of proceeding in a physician and in a trainer? Is he the better who accomplishes his ends in a double way, or he who works in one way and that the ruder and inferior?"[1]

A few practical medical or semi-hygienic suggestions are worth mentioning while we are considering Plato; thus—Much sleep is not required by nature, either for our souls or bodies, or for the actions in which they are concerned. For no one who is asleep is good for anything any more than if he were dead; but he of us who has most regard for life and reason keeps awake as long as he can, reserving only so much time for sleep as is expedient for health, and much sleep is not required if the habit of not sleeping be once formed.[2]

In the following passage from the *Laws* of Plato we have a good unconscious description of what would apply to the empirical school of physicians; they had not come into existence in the time of Plato, but we shall have to make mention of them presently. In speaking of the inferior kind of doctor who attends slaves, Plato says:

"Of this you may be very sure that if one of these empirical physicians, who practise medicine without science, were to come upon the gentleman physician, talking to his gentle patient and using the language almost of philosophy, beginning at the beginning of the disease and discoursing about the whole nature of the body, he would burst into a hearty laugh—he would say what most of those who are called doctors have at their tongue's end: 'Foolish fellow,' he would say, 'you are not healing the sick man, but you are educating him, and he does not want to be a doctor but to get well.'"[3]

There is a fine passage in which Plato points out the impossibility of any art imposing upon itself universal rules:

"Let us put to ourselves the case of a physician who is about to go into a far country, and is expecting to be away a long time from his patients; he leaves written instructions for the patients or pupils under the idea that they will not be remembered unless they are written down. But what would you say, if he came back sooner than he intended, and owing to an unexpected change of the winds or other celestial influences, some other remedies happened to be better for them, would he not venture to suggest these other remedies, although differing from his former prescription? Would he persist in observing the original law, neither himself giving any new commandments, nor the patient daring to do otherwise than was prescribed, under the idea that this course only was healthy and medicinal, all others noxious and heterodox? Viewed in the light of science and true art, would not all such regulations be utterly ridiculous?"[4]

So great was the influence of Plato upon the school of the Dogmatists that Dexippos of Cos, one of the immediate followers of Hippocrates, was induced to defend the absurd notion that liquids, or at least the more subtle parts of them, passed into the lungs, because this belief had been enunciated by Plato in the *Timaeus*.

We have seen that Plato had a good many things to say about medicine, but he was not specially interested in it. The extraordinary interest of the modern world in medicine and disease is wholly alien to the Platonic conception of them. To Plato, as to the ancient world generally, disease was a tiresome and meaningless exception to the ordered regularity of a harmonious life which no philosophic mind would waste time in studying. The ordinary citizen ought to be healthy, sane, and strong, and the man who was properly occupied had "no leisure to be ill." Focused upon the State as the mind of the antique world undoubtedly was, the needs of the individual were less minutely considered than is the case with us, and not only sickness but also old age was apt to come off second best. With the increase of the apparatus of living and the general complexity of modern life, every aspect of existence is subjected to an almost

morbidly minute analysis. Among the ancients life was infinitely more simple than with us, but it must be confessed that to some extent the simplicity was purchased by ignoring some awkward facts, such as diseases and the discomforts of old age. The fact is that with regard to the solution of many difficult social problems the ancients had a genius for cutting knots which the modern world prefers to untie.

THE EMPIRICS.

It is hardly surprising that the school of Dogmatists with their philosophical disquisitions and hair-splitting dialectics should have aroused the natural antagonism of the so-called practical man, who prides himself on his contempt for all theories. Accordingly, in direct opposition to the Dogmatists arose the school of the Empirics, and certainly as against the Dogmatists these reformers had a very definite case, but unfortunately, as happens with all reactions, they became characterized by the most extreme and even absurd views. The founders of this school were Philinos of Cos and Serapion of Alexandria (fl. 280 B.C.). They were the pupils of Herophilos and Erasistratus of Alexandria, whose names are well known to all students of anatomy, and they took Aristotle for their intellectual leader. As opposed to the Dogmatists they declared the attempt to search after the ultimate causes of phenomena entirely vain: at the same time they were active in endeavouring to elicit the immediate causes.

Serapion, in addition to writing with great vehemence against Hippocrates, was almost exclusively occupied in researches on remedies and entirely neglected diet; the remedies he made use of for epilepsy have a strong savour of superstition about them, for, apart from castoreum, he advised the brain of the camel, the heart of the hare, rennet from a seal, and the blood of the tortoise.

A special stimulus was given to this school by the immense commerce of the Ptolemies, which had brought to light a large number of new medicines, with which it was possible to experiment in a purely empirical fashion. Many physicians occupied themselves entirely in experimenting with new remedies without paying any attention to the theories of the Dogmatists. They are only known to us from their preparations of certain composite remedies. In those days it was the fashion for kings and princes to take an interest in medicine, as was the case with Attalus, King of Pergamos, and Nicomedes, King of Bithynia. Attalus cultivated in his garden various poisonous plants, such as aconite, hellebore, hemlock, and henbane, and tried the effect of antidotes, several of which became known by his name. More celebrated still was Mithridates, King of Pontus, who took a poison and an antidote every day to render himself immune to poisons.

The main intellectual support of the school of Empirics, however, was derived from the influence of Pyrrho (fl. 340 B.C.), the founder of the Sceptical school of philosophy, which was contemporary with the great philosophic schools of the Stoics and Epicureans. Pyrrho came from Elis, and first followed the profession of a painter, but is said to have been attracted to philosophy by studying the writings of Democritus. He accompanied Alexander the Great to India, and, according to a tradition, came in contact while there with the Sages of the East, from whom he seems to have carried away that strange impassiveness and detachment which he strove in after life to reproduce. He lived poor but universally honoured, and died about 270 B.C., when nearly 90 years of age.[5]

The philosophy of Pyrrho denied everything, because according to it there are equal reasons for the affirmative and negative in all propositions. We ought not, therefore, to maintain anything, not even our own experience. To Pyrrho it seemed impossible to know the true nature of things, for our perception only shows us things as they appear, not as they really are in themselves. The only correct intellectual attitude, therefore, which a man could adopt was one of "suspended judgement." This philosophy of doubt limited all investigation to the narrow sphere of sense knowledge. There was nothing absolutely new in this; the Eclectic school of philosophy in particular had given rise to Sceptics, and Parmenides as well as other philosophers had opposed the knowledge we get from our senses to that which we obtain by the power of the mind.

Put shortly, the view of the Sceptics was this: In the case of any given phenomenon we affirm it as an appearance to ourselves, we do not make positive statements about the nature of external objects in themselves. "That honey is sweet I refuse to assert; that it appears sweet I fully grant," says Timon, the disciple of Pyrrho. Man, as distinguished from other animals, has in the sphere of phenomena a faculty of following the process of things and retaining it. In virtue of this he remembers what phenomena he has observed accompanying each other, what preceding and what coming after, so that when the first members of the sequence are presented to him the rest are revived. Thus the Sceptic did not refrain from inferring the existence of fire when he saw smoke, or the existence of a wound when he saw a scar,[6] but of course he had to see the smoke and the wound. Now this scepticism differed from modern agnosticism, as, according to it, you could only infer what you did not see from what you did see, consequently the theory of the existence of atoms and pores in the body was repudiated, because atoms and pores were things which could never come within the range of sense perception. Hence such an induction as Kepler's of the movement of the planets in an ellipse would have been impossible for this school; in fact the immense part which working hypotheses have played in modern science was far from the thought of the ancient Sceptic.

The early followers of Pyrrho consisted almost entirely of physicians, who gradually formed the Empirical school of medicine. They rejected all judgements which are not immediately derived from sensations, and, like Pyrrho, they confessed that they were completely ignorant of the essence of things, affirming further that the essence was impenetrable because it escapes the recognition of the senses.

They paid particular attention to the totality of symptoms without occupying themselves with the nature of disease or its causes; for, they said, medicine is concerned with the cure of disease, not with the cause; they did not want to know how we digest but what is digestible. In subjecting the art of observation to fixed and invariable rules they rendered science a more important service than most of the speculations of the Dogmatists. No attempt, however, was made to comprehend or search into the hidden causes of symptoms, but the whole art and science of medicine became for them reduced to a system of therapeutics and of therapeutics only.

In endeavouring to find out what particular line of treatment would get rid of a particular set of symptoms they employed three methods, which became known as the "Tripod of the Empirics":

1. A man's own chance observations.
2. Learning from his contemporaries and predecessors—history.
3. In the case of new and strange diseases drawing conclusions from those most similar to them—analogy.

Later on a fourth method was added called "epilogism." This was the process of inferring preceding events from the present symptoms.

The Empiricists resembled Hippocrates in paying great attention to clinical observation, and, like him, they were guided in treatment at the bedside almost exclusively by experience. Like him, too, the Empirics attached great importance to climate, and they went so far as to assert that remedies which were necessary at Rome would have no effect in Gaul, and that a line of treatment which might be useful in that country would be quite inapplicable in Egypt. Consequently they did not in medicine admit rules which had a universal application. In one respect they may be said to have surpassed Hippocrates in that they systematized the technique of medical procedure and sought to free clinical methods of thought from the subjectiveness of the individual observer.[7] Unlike Hippocrates, the Empirics made no attempt to reach general laws from isolated facts, but we feel some sympathy with them when in opposition to the Dogmatists they asserted that "the husbandman and navigator are not trained by disputations but by practice." The important question is not what causes disease but what dispels it. Diseases are not cured by talk but by drugs.

Perhaps the most celebrated representative of this school was Menodotus of Nicomedia (fl. first century A.D.), who was less intransigent than most Empirics, for he did not insist upon an inherent opposition between observation and reasoning, between facts and explanation, between mind and experience.[8] He also seems to have recognized the value and purpose of a provisional hypothesis, but he did not hesitate to write with some violence against the Dogmatists, speaking of them sometimes as "mere followers of routine," at others as furious lions. In his eyes medicine had no other aim but utility and fame and could never aspire to the title of science. The other best known name belonging to this school is that

Heraclides of Tarentum, who lived in the early part of the second century B.C. In addition to his medical studies he devoted some time to the investigation of poisons and wrote much upon antidotes, of which opium and hemlock formed the base. He was the only member of the Empirical school whom Coelius Aurelianus of the Methodist school thought worth refuting. His treatment of madness was quite rational: he first put the patient in a dark room, bled him, purged him every day, and applied fomentations to the head. He wrote a book of prescriptions for soldiers, and also upon remedies for affections of the skin and falling out of the hair, and in fact gave rise to the art of cosmetics which became widely spread in Alexandria.

As we have said, the Empirics were indebted to the Sceptics for their intellectual background. As a school of medicine their existence continued for a considerable time even in the early part of the third century A.D., in which Sextus Empiricus flourished, a younger contemporary of Galen, and one who was himself partly an Empiric and partly a Sceptic, and it is from him that most of our knowledge of this school of medicine is derived. Sextus maintained that scepticism alone can make man happy, because it teaches that nothing is naturally good or bad. Like the Sceptics generally Sextus was disposed to consider phenomena true for practical purposes; he did not deny that some useful knowledge was traditional and might be communicated by speech or writing, for no man's sole experience is sufficient to give him all useful knowledge, but he rejected all scientific investigations of phenomena as idle inquiries. He did not realize that all scientific knowledge means the recognition of the interrelations of phenomena.

From what has been said it will be easily understood that the Empirical school was more satisfactory in practice than in theory. Attention was focused upon the requirements of the sick man, without elaborating any hypothesis as to the cause of his sickness. By keeping close to the facts, eschewing theories, and by the careful observation of symptoms, not only were useful contributions made to medical knowledge, but the imagination was held under some sort of discipline, prevented from running riot and indulging in the cruder forms of superstition. Collecting facts is always useful, but it is the beginning and not the end of medicine.

We have seen how one of the most powerful influences in giving rise to this school was the sceptical philosophy of Pyrrho, which attracted so many physicians. Scepticism in homoeopathic doses may often serve as a useful antiseptic, so to speak, to a dogmatism which is growing fixed in routine, but when pushed to its logical extreme scepticism tends to believe in its own sceptical disbeliefs. In a sense it is a sign of the world weariness and disillusionment which began to overtake Greek thought in the third century B.C. All extremes tend to produce their opposites, so that a period of Agnosticism is likely to be followed by an outburst of Gnosticism. The entire mistrust of the senses, and indeed of the reason, gradually urged the spirit to search for truth beyond the limits of natural knowledge to some possibly higher source transcending time and space, and this search, aided by impulses streaming in from the East, eventually found a resting place in the philosophy of Neo-Platonism. There is little doubt that the position of scepticism is one in which the human heart can never permanently acquiesce, and if, as was said by Vauvenargues with profound insight, "Great thoughts come from the heart," the intellectual part of man's being will remain equally unsatisfied.

REFERENCES.

[1] Plato, *Laws*, Bk. iv, 720. [2] Ibid., Bk. vii, 803. [3] Ibid., Bk. ix, 857. [4] *Politicus*, 295. [5] E. Bevan, *Stoics and Sceptics*, p. 123. [6] Ibid., p. 126. [7] Neuberger. [8] Clifford Allbutt, *Greek Medicine in Rome*, p. 165.

(To be continued.)

IT would appear from W. Bredt's Report for the year 1922 that the supply of quinine is much in excess of the demand. Although the stock of quinine sulphate in London fell during 1922 the price, which was 5s. 3d. at the beginning of 1920 and 3s. 5d. at the beginning of 1921, fell in 1922 to 2s. 1½d. The export of bark from East India, Java, and Africa fell from 2,647 packages in 1921 to 340 in 1922, and the exports of quinine from Java indicate a similar decline. The international stock of quinine at the end of the year appears to have been about 23 million ounces. All these facts must militate against the efforts of the Indian Government to extend cinchona cultivation and quinine manufacture.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ALBUMINURIC RETINITIS AS A PROGNOSTIC SIGN.

THE importance of albuminuric retinitis as a grave sign in prognosis is now well established. The occurrence, therefore, of a case of recovery of the retinae from the characteristic changes due to nephritis is worthy of record. One looks on the discovery of this fundal lesion as allowing but a short lease of life—in other words, a period of from six to twelve months at the longest. The case would seem to show that if the nephritis could be recovered from the retinitis might also be capable of cure.

A youth aged 15, rather big for his age, in October, 1914, had double pneumonia, with left empyema, which was opened and drained in the London Hospital, and from which he made a good recovery. About the beginning of May, 1915, his urine became black, like porter. There was no skin rash nor sore throat, and the condition was not scarlet fever. In June he was anaemic, with oedema of face and legs, which pitted on pressure; there was no desquamation anywhere. He had slight diarrhoea. The urine (specific gravity 1030) was dark red, solid with albumin on boiling, thick curds with nitric acid. Only about half a pint of urine was passed in a day; albumin amounted to 10 grams per litre. The oedema of the legs, scrotum, and body all ceased, and I admitted him into hospital, where, with a mixture of urotropine and the aid of Southey's tubes, the oedema gradually diminished over a period of some months.

By May 15th of the next year (1916) the boy looked well, and the oedema had all gone. He said, however, that he could not see clearly, and especially could not read. The urine still amounted to 3 pints daily (specific gravity 1015, albumin 9 grams to the litre). I found that he had marked albuminuric retinitis, especially in the right eye, which was the worst from the point of view of vision. There was a large white circular patch at the macula, surrounded by a typical radiating glistening fan, and also slight neuritis of disc, but no haemorrhage. In the left eye there was slight neuritis of the disc, small stippled white spots in a group at the macula, and from the macula to the disc. Shortly after this he went home with a prognosis as regards life of from six to twelve months at most.

I was called to see him again on September 15th, 1922. He had had during the previous week some abdominal pain with diarrhoea, some blood in the motions, and bleeding from the gums; there was no oedema, and no abdominal tenderness. His face was florid, his pulse slightly irregular; there were very marked large striae on the skin of the flanks, groins, abdomen, and sides of the thorax—evidences of his previous dropsy. The urine (specific gravity 1020) was full of albumin, 6½ grams to the litre. On September 20th the boy had uraemic convulsions and nose bleeding, and was admitted into hospital. The ocular fundi were examined, and were both normal. On September 22nd he had more convulsions, became comatose, and died.

Not having seen the youth from May, 1916, to September, 1922—as he had been living elsewhere—I cannot say how he had actually been in the interval of over six years, but his parents said that he had been apparently quite well, had worked hard, never complained, nor had had to lie up. He had recently become engaged to be married. One may presume at least that, although the dropsy had disappeared, the albuminuria persisted during this period of six years. But the most interesting points are: (1) the disappearance of such a condition as typical retinitis, and (2) the return to sufficient health to be able to work hard for over six years.

Enfield. FRED. TRESILIAN, M.D., F.R.C.P.

ATOPHAN POISONING.

IN the *Epitome of Current Medical Literature* for January 6th appears the abstract of an interesting paper by K. Schroeder, emphasizing the value of atophan in gouty conditions, and at the same time pointing out the liability of certain cases to develop toxic symptoms from the drug. The warning that the patient should be under close medical observation when taking atophan is most necessary, as the toxic effects do not appear generally to be well known. To the symptoms of atophan poisoning—general malaise, headache, gastro-intestinal disturbance, urticaria, albuminuria—it would seem that jaundice must be added, as its occurrence in the following case could scarcely be a coincidence.

A man aged 59, who had suffered from recurrent gouty manifestations for nearly twenty years, began to take 7½ grains of atophan (phenyl-chinolin-carboxylic acid) three times daily. At the end of twelve days he developed an urticarial rash and discontinued taking the drug. Three weeks later, the urticaria having disappeared, he thought it safe to resume, and took a further 7½-grain dose. On the following day the urticarial rash reappeared accompanied by intense pruritus; on this occasion he sought advice, and although no further atophan was taken the

urticaria proved most persistent, fresh patches occurring day by day with considerable gastric disturbance for ten days, when jaundice supervened. The jaundice was of moderate depth, but no tenderness nor enlargement of the liver was apparent. The jaundice did not clear for several weeks.

CECIL WORSTER-DROUGHT, M.D.Cantab.

London, W.

Reports of Societies.

THE NEW TRYPANOCIDAL REMEDIES.

A CROWDED meeting of the Royal Society of Tropical Medicine and Hygiene was held on January 18th, under the presidency of Sir JAMES CANTLIE, when communications were read by Dr. G. C. LOW and Dr. P. MANSON-BAHR, of the Hospital for Tropical Diseases, London, on the treatment of human trypanosomiasis by the new drug known as "Bayer 205," and by Dr. C. C. CHESTERMAN of the Belgian Congo, on the action of tryparsamide in sleeping sickness. Some account of the earliest work on the former compound appeared in the BRITISH MEDICAL JOURNAL of September 23rd, 1922 (p. 569), and on the latter compound on December 16th, 1922 (p. 1183). The composition of "Bayer 205" is not known, but it is believed to be a dye containing amino-naphthalene-sulphonic acid with complex formula. Tryparsamide is a pentavalent arsenic compound and a derivative of atoxyl.

"*Bayer 205.*"

Dr. G. C. LOW said that the first experience of his colleague and himself with regard to "Bayer 205" was in 1921, when Sir David Bruce, having received some samples of the drug from Germany, handed them over to Dr. C. M. Wenyon for certain experiments on infected mice, and some of Dr. Wenyon's supply was given to him (Dr. Low) to try on his first human case. At the same time Dr. Manson-Bahr was able to get in touch with Dr. Hennings, of Bayer and Company, the well known aniline chemists of Germany, who had continued to supply Dr. Manson-Bahr and himself with an amount of the drug adequate for the treatment of the cases of trypanosomiasis under their care. Acknowledgement was due to Dr. Hennings and the Bayer firm for their invariable courtesy. The drug had been used by Dr. Manson-Bahr and himself in nine cases, seven of which had recovered and two had died. Of the recovered cases five were present at the meeting. In eight of the cases the infecting agent was *T. gambiense*, and in one (a fatal case) it was *T. rhodesiense*. The patients were all Europeans, of a high educational standard, and able to express their feelings in a manner not easily obtainable among African natives. With their recovery there had been observed in them a return of those finer traits of character the loss of which was such a distressing feature of the disease among Europeans. In treating the cases usually 1 gram of the drug was given intravenously in a 10 per cent. solution of distilled water. He and his colleague were at first at a loss to know exactly what dose to inject, and the injections started very tentatively. Ultimately it was found most satisfactory to give a dose of 1 gram every week for ten weeks. These ten doses were regarded as the standard course, though in some cases they had been exceeded. In the majority of the cases a slight albuminuria, accompanied as a rule by the appearance of small granular epithelial casts, made its appearance on treatment, but so far as the work had gone at present "205" did not appear to lead to a chronic nephritis such as to endanger the life of the patient. In some cases an extensive erythematous rash appeared, together with pruritus, after injection. The limit of tolerance of the drug had yet to be discovered. In one case a dose of 2 grams in a single injection was well tolerated, and not followed by any grave disturbance, and in another an amount up to 6 grams in one week was injected intravenously with apparent safety.

The first of the cases he described was a man, aged 49, who showed the first signs of the illness while in Nigeria in July, 1921. He was sent home, when trypanosomes were found quite easily in the blood, and a lumbar puncture showed them to be present in the cerebro-spinal fluid as well. Some injections of "205" were given, but the drug was stopped owing to the condition of the kidneys, and antimony and atoxyl took its place. Later, from July to September, 1922, the full course of 10 grams of "205" was administered, with the result that the patient improved greatly, and he was shown to the Society a healthy man.

In three other cases the disease was contracted in Nigeria also, and the patients were sent home and put upon the course of "205," with the result that the various symptoms cleared up rapidly, though albuminuria persisted for a long time in one case, and in another there was still a slight trace of albumin. These three men were present at the meeting.

Dr. Low also mentioned the case of a lady from the Congo who was sent home to England and admitted to hospital in December, 1921. She had been bitten by a tsetse fly, and had had fever with general malaise and body pains, and trypanosomes were found in the blood. Atoxyl treatment was started while she was in Africa, but without satisfaction, and on arriving in London she was put upon the course of "205," and left hospital in May last, apparently in perfect health, and no further signs or symptoms of trypanosomiasis had been noted.

Dr. MANSON-BAHR described one remarkable case with which he had had specially to do.

This patient, who also was present, was a man aged 37, who became ill while out in the Congo in January, 1920, when both the trypanosome and the malarial parasite were found in abundance in his blood. He left for England in March of that year, the trypanosomes meanwhile disappearing and reappearing in the blood stream in an irregular fashion. No marked diminution in their numbers followed treatment with atoxyl or galyl. When he arrived in hospital in May, 1920, his clinical condition was very poor. He suffered from drowsiness, from which it was difficult to rouse him, he was emaciated, mentally depressed, and subject to slight pyrexia. He stayed in hospital for eighteen months, and had his ups and downs on various forms of treatment, quite heroic drug therapy being practised, but he never actually made any progress until treatment with "205" was started on December 1st, 1921. From the first injection the trypanosomes disappeared from the blood stream, and had never been found since. He received ten injections, although it appeared that the first had cured him, and his condition during the whole of 1922 greatly improved, he gained weight, and now was quite well, physically and mentally.

Dr. Manson-Bahr alluded to another case—that of a lady missionary on the Congo—who had recovered, and then he turned to the more sombre side of the picture and detailed two cases which had terminated fatally.

In one of these a total dose of 18 grams of "205" was given without avail, and the end came with dramatic suddenness with a succession of fits epileptiform in character. In this case there was very strong evidence that the trypanosomes lying in the brain substance were not influenced by the intravenous injections.

The other case had a first course of 14 grams of the drug, followed by improvement and relapse, after which it was decided to push the injections, and the amount of drug was increased to 2 grams at each injection, and eight injections were given during the month of November last. Again there was improvement, but the trypanosomes reappeared, the patient lost weight, deteriorated mentally, and died on January 6th.

Therapia sterilisans magna, though desirable, was probably as unattainable in human trypanosomiasis as in syphilis. The best effect seemed to be produced by giving the first three injections at close intervals, and thereafter spacing out the remainder into gram doses once a week. The effect of the drug on the specialized renal epithelium needed to be watched. The significance of albuminuria with casts need not, however, be regarded as absolutely contraindicating the further use of the drug.

Dr. A. C. STEVENSON spoke on the pathological changes in the brain in one of the fatal cases. His conclusion was that the terminal stages of human trypanosomiasis were due to the invasion of the brain tissue by trypanosomes; that the presence of trypanosomes in the cerebro-spinal fluid was only of a diagnostic value, and had probably no influence on the course of the disease; and that the spread of the parasite to the extravascular tissues was primarily the result of migration of the trypanosomes through the vessels.

Dr. C. M. WENYON described experiments in which he had given to infected mice intravenous injections of the blood stream and cerebro-spinal fluid of patients who had received doses of "205." From his limited experiments it might be inferred that the intravenous injection of 1 gram of "205" in man caused the formation of a trypanolytic substance in the blood and cerebro-spinal fluid, and that this substance was still present a week after injection.

Tryparsamide.

Dr. C. C. CHESTERMAN then gave an account of some work he had carried out, mainly during 1922, at a hospital of the Baptist Missionary Society near Stanleyville in the Belgian Congo. Out of more than 300 cases diagnosed as sleeping sickness during this period 40 were selected because (1) the source of their infection was known, (2) they showed definite symptoms of nervous involvement and altered cerebro-spinal fluid, and (3) they would consent to remain in the lazaret where there was no possibility of reinfection during treatment. A course of eight weekly intravenous injections of tryparsamide was given, each injection in a solution made up with boiled rain water, of a concentration equal to 3 grams in 10 c.cm.

From the results in 24 cases which had received no previous treatment (except from the witch doctor), it was evident that if the maximum dose of tryparsamide which could be injected were given regularly and in sufficient quantity to patients who were even in the last stage of the disease there was every chance of reducing the cell content of the cerebro-spinal fluid to normal, and of removing, at any rate for the time, all symptoms with the exception of those due to the permanent damage sustained by the central nervous or other systems. In ten patients who had already received varying amounts of atoxyl or tartar emetic or other remedy without any great benefit, the clinical improvement following on the administration of tryparsamide was scarcely less striking, and good results also were obtained in six cases which had first been treated unsuccessfully by the intrathecal serum method lately described by Marshall and Vassallo in Uganda. He believed the action of tryparsamide to be superior to that of atoxyl, and that its action was gradual, so that there seemed to be a minimum total dosage, which was sufficient to render normal the cerebro-spinal fluid, of about 20 grams in an average sized and well nourished patient. Successful treatment seemed to depend on maintaining the maximum safe concentration of the drug in the system for from six weeks to two months. It seemed, therefore, impossible to escape the conclusion that the active trypanolytic constituent of tryparsamide found its way into the central nervous system. The maximum tolerated dose should not exceed 4 grams a week for a full-sized adult, and if given regularly for about eight weeks it was capable of completely removing the trypanosomes from the cell content of the cerebro-spinal fluid of even the most advanced cases. This change in the fluid was accompanied by a very marked clinical improvement, fully maintained for the period—eleven months or less—over which it had been possible to make observations.

Dr. NIERENSTEIN added some chemotherapeutical considerations, pointing out that tryparsamide differed from atoxyl, firstly in the fact that the arsenic was held in pentavalent combination instead of in the less stable trivalent form, and secondly that it contained the glycin group.

Atoxyl and other Treatments.

Dr. DERWISH gave an account of his inspection of the Yei sleeping sickness camp in Mongalla Province last summer, and stated the present condition of the patients who had been treated several years previously with antimony and salvarsan, antimony and atoxyl, and various combinations. Of twenty-seven patients treated with antimony and salvarsan (after an interval of not less than ninety-two months subsequent to all treatment), thirteen were in good condition, three in fair condition, and thirteen were dead. The results had not yet undergone the full test of time, and it was premature as yet to say whether the fall in mortality meant a long period of remission of the disease or a real recovery.

Discussion.

Professor SIMPSON said that he had no doubt that excellent results had been obtained with "205," but there was a serious drawback to the use of this drug, because quite a number of the patients had not only albuminuria but casts, which implied some kidney damage. It would be extremely unsafe, in his opinion, to use this drug on a large scale in Central Africa, though it was all very well to use it among Europeans in hospital under the care of skilled physicians. His own impression was that the problem had not been brought nearer solution than it was eighteen months ago, and the proper course would be to send out a commission of medical men and veterinarians to Africa to carry out experiments with the different drugs on a large scale over a long period. He believed that the salvarsanized serum method of Marshall and Vassallo still held the field.

Sir FREDERICK MOTT said that it seemed to him probable that when the trypanosomes were found in the cerebro-spinal fluid this was an indication that they were also in the brain substance. In that event it was very difficult, as also with the organisms of syphilis, to remove them. He was in Berlin when salvarsan was first introduced, and he recalled the enthusiasm with which it was anticipated that general paralysis would be cured, but this had not been possible. It was the same with trypanosomes: once they got into the brain the case would not be cured by any of these drugs.

Dr. ANDREW BALFOUR suggested that the problem of getting at these trypanosomes in the brain substance might be solved by combining with the trypanocidal substance some vector in the shape of a dyestuff having a certain affinity with nerve tissue. In that way—it was only a hypothesis—it might be possible to reach trypanosomes deep in the brain.

In replying on the discussion, Dr. LOW said that in Dr. Manson-Bahr's recovered case, shown that evening, in which there had been well marked signs of sleeping sickness, it seemed as though the brain must have been affected, and yet the drug in some way had penetrated. His own first case showed trypanosomes present in the cerebro-spinal fluid as well as in the blood. Dr. MANSON-BAHR combated the idea that "205" was necessarily a very toxic drug. It was an aniline product and contained no metal of any sort. From work on animals it was known to be also efficacious when given subcutaneously; probably the subcutaneous method would prove more efficacious because the drug was then stored up in the tissues. He thought that too much might be made of the occurrence of albuminuria in these cases. In some instances, even with massive doses, there was no albuminuria at all, and in others the effect on the kidneys was very transitory. It was not his view that this drug was going to be a remedy for every case; probably it was not as efficacious as tryparsamide, but it was more safe. Dr. CHESTERMAN said that, so far as conditions in Central Africa were concerned, the problem of dealing with native sickness could be met by a drug which would make it possible to sterilize the peripheral blood for a period of two or three months.

SPHENO-OCCIPITAL CHORDOMA.

At the meeting of the Pathological Section of the Royal Society of Medicine held on January 16th Professor M. J. STEWART and Dr. LE FLEMING BURROW (Leeds) described, and showed specimens from, a case of malignant chordoma of the base of the skull (spheno-occipital chordoma).

The patient was a man of 30, who after three years' service in France was invalided from the army for "phosgene-gas poisoning." When admitted to hospital on November 28th, 1921, he gave a three years' history of cough, headache, occasional vomiting, and unsteadiness in walking. A year before he had complained of failing vision, and was found to have optic atrophy, most marked on the left side. Recently he had complained of weakness in the legs and in the right arm.

When examined on November 30th he had blurring of speech, cyanosis, and laboured respirations, with dysarthria of paretic type. Examination of the cranial nerves revealed blindness and primary optic atrophy of the left eye, with early atrophy and diminution of the visual field on the right side. The left pupil was large and immobile. The left third, fourth, and sixth nerves were weak, but not completely paralysed, and the remaining cranial nerves appeared normal. He made considerable complaint of pain and stiffness in the neck, especially when the head was flexed on the chest, but while the cervical and upper dorsal vertebrae were held rigid there was no tenderness on percussion nor on palpation. The cerebro-spinal fluid was normal in all respects, but was under slightly increased pressure.

The patient's progress was steadily and rapidly downwards. The paresis of the legs and right arm increased, and was followed by loss of power in the left arm. The respirations were laboured throughout, and the patient finally died on December 5th, apparently of respiratory failure.

Post-mortem examination revealed the presence of an irregularly nodulated ovoid tumour springing from the central area of the base of the skull. It was completely covered by dura mater, and was not adherent to the brain. On its inferior aspect it had extensively infiltrated and destroyed the central portion of the base of the skull—namely, the clivus, pituitary fossa, and subjacent parts. It did not appear, however, to have invaded the nasopharynx. The tumour had led to great stretching, flattening, and distortion of the mid-brain, especially the pons and crura cerebri, the optic tracts and chiasma, and, generally, the structures forming the floor of the third ventricle. The pituitary gland had been completely displaced from its bed and was flattened out on the antero-superior aspect of the tumour.

The naked-eye and microscopic characters of the growth conformed to those of chordoma. The tumour was gelatinous, transparent, and very friable, especially in its deeper parts. Microscopically it was alveolar in structure, being broken up into masses of various sizes by narrow bands of fibrous tissue carrying the blood vessels. The alveolar masses were devoid of both vessels and stroma. They were composed of epithelial-like cells—spheroidal, ovoid, and polygonal—and everywhere mucoid degeneration was in progress. To begin with, small droplets of mucin appeared in the cytoplasm, and as the cell grew older these increased both in size and in number until the typical "physaliphorous" appearance was seen. The next stage in the evolution of the cell was that the mucin droplets were discharged, and might either flow together, forming homogeneous or granular masses of varying size throughout the growth, or might simply form a vacuolated, almost fibrillated, groundwork breaking up the tumour tissue into little groups of shrunken cells. Both the intra- and extra-cellular droplets gave the staining reactions of mucin (polychrome methylene blue, thionin blue, etc.).

The authors added that some 40 cases of chordoma of clinical interest were now on record, and were about equally divided between the two seats of election of this tumour—the spheno-occipital and sacro-coccygeal regions. The small hernial protrusions of notochordal tissue from the clivus, called by Virchow "ecchondrosis physaliformis," were probably much more common than this, but could hardly be regarded as genuine neoplasms. Two examples of this condition had been met with in 150 specially investigated autopsies. Virchow wrongly regarded these nodules as cartilaginous, and his term was a misnomer; the condition would be more correctly designated "ecchordosis physaliformis."

Classification of B. diphtheriae.

Dr. A. J. EAGLETON read a paper by Miss BAXTER and himself on the serological classification of *B. diphtheriae*. Beginning with a historical summary, Dr. Eagleton went on to describe the investigation, which he and Miss Baxter had carried out, of 358 strains of virulent *B. diphtheriae*. The strains had been derived from a wide "catchment" area. Three hundred and forty-two of the strains had fallen into one or other of ten clear-cut groups, and amongst the remaining 16 at least four serological varieties had been encountered. Dr. Eagleton did not maintain that strains examined by different observers in different areas would necessarily fall into the same ten types which he had found—on the contrary, he would rather expect to find a multiplicity of types in existence. Some evidence was brought forward of a structural similarity between strains belonging to the different types. It was hoped that work along these lines would prove of value to epidemiology in the future.

CARCINOMA OF THE VAGINA AND CERVIX.

Tumours of the Vagina.

A MEETING of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine was held on January 4th, with the President, Dr. T. WATTS EDEN, in the chair, when Mr. EARDLEY HOLLAND showed a specimen of primary carcinoma of the vagina.

The patient was aged 46, had four children, and on examination a hard, circular, rough, friable growth was found on the upper third of the posterior vaginal wall; the upper edge of the growth was quite separated from the cervix. The cervix looked and felt normal, the uterus was normal in size and position, and there was no palpable evidence of other pelvic disease. Rectal examination did not reveal any infiltration of the anterior rectal wall, which could be moved freely over the posterior surface of the growth. At operation the whole of the vagina and uterus, together with the pelvic cellular tissue and iliac lymphatic glands, were removed, and the patient made a good recovery.

In such cases, owing to the close proximity of the posterior vaginal wall to the rectum, and to the very small amount of intervening cellular tissue, it seemed almost certain that permeation of the carcinoma cells into the anterior rectal wall must take place at a very early stage of the growth. The question therefore arose as to whether it was not also advisable to remove the lower part of the rectum, although the operation would then become an extremely severe one.

Mr. STEVENS showed a specimen of squamous epithelioma of the vagina.

On examination of the patient, a married woman aged 53, a large flat growth, about the size of a five-shilling piece, was found on the posterior vaginal wall; at first it was thought to be an extension from a cervical growth, but this was found at the subsequent operation not to be the case. The uterus and upper half of the vagina, with the whole growth, were removed by abdominal pan-hysterectomy, after isolation of the ureters. The patient made an uninterrupted recovery, and eight weeks after the operation received a large dose of *x* rays to try to prevent a recurrence. Up to the present time she had remained quite well. The growth proved histologically to be a squamous epithelioma.

Dr. HERBERT SPENCER showed a specimen of adenoma of the vaginal fornix simulating carcinoma of the cervix.

The patient, a multipara aged 44, had suffered from vaginal haemorrhage for nine months. On passing the finger into the vagina a brittle growth as big as a large duck's egg, which bled very freely, was found nearly to fill the vagina; a diagnosis of proliferating carcinoma of the cervix was made. At operation, however, the growth was found to be attached to the fornix of the vagina to the left and front of the cervix. The cervix itself was normal, except for two minute mucous polypi, which were snipped off. Radium was applied; in a fortnight the wound cicatrized. Subsequent microscopical examination showed the tumour to be benign; two and a half years after the operation the patient remained quite well and the vagina and uterus were healthy. The occurrence of a large pedunculated, benign adenoma of the fornix simulating carcinoma was very rare, and he had not come across the record of a similar case.

Dr. RUSSELL ANDREWS said that fifteen years ago he had operated on a case of primary carcinoma of the upper part of the posterior vaginal wall, by removing the uterus and vagina by the vaginal route, and the patient had remained free from recurrence. He did not think that routine removal of the rectum was justifiable in cases of carcinoma of the vagina.

Radium in Carcinoma of the Cervix.

Mr. A. H. RICHARDSON showed a specimen of a uterus removed for carcinoma of the cervix after radium.

Laparotomy was performed and an attempt was made to remove the uterus, but was given up on account of the fact that, on separating the bladder from the cervix, the growth was opened into. Three weeks later a quantity of friable growth was scraped out of the cervical canal and 100 mg. of radium was placed in the cavity and left in for thirty-six hours. Three months later the same amount of radium was again applied for the same time; two months later it was impossible to say, on examination, that there had ever been any growth, and it was decided to operate. The patient could not come into hospital because of domestic reasons. Six months later the operation was performed, and there was no difficulty in performing radical abdominal hysterectomy. The specimen was carefully examined by Dr. Dudgeon, who reported that microscopically he could see no growth, and that on microscopical examination of several different parts of the cervix he could find a small focus of a typical carcinoma in only one place.

The PRESIDENT and Mr. AUBREY GOODWIN showed two cases of carcinoma of the cervix treated by radium before operation.

Case 1.—An extensive friable growth covered the whole cervix and extended over the left and posterior vaginal walls for an area of about 2 cm.; the mobility of the uterus was impaired. The growth was scraped away with a sharp spoon, and into the large cavity thus formed 200 mg. of radium bromide was introduced and left for twenty-four hours. Nearly a month later no trace of the growth could be found on examination. Wertheim's hysterectomy was performed without difficulty. Examination of the specimen showed an extensive columnar-celled carcinoma of the upper part of the cervix, but the vaginal portion of the cervix and the vaginal cuff showed a healing, granulating surface with no malignant cells to be seen.

Case 2.—There was a large irregular friable growth of the cervix which practically filled the upper part of the vaginal canal, extending upon the vaginal wall for a short distance. The growth was scraped away and 160 mg. of radium bromide was introduced in three tubes and left for twenty-four hours. When the patient was examined fifteen days later no trace of growth could be found. The uterus was removed without difficulty by Wertheim's hysterectomy. Examination of the specimen showed that the cervix was hypertrophied and contained several hard whitish areas; microscopically, there was adeno-carcinoma of the cervix, including hyaline changes, with much round-celled infiltration of the growth.

The PRESIDENT thought that malignant disease would in future be treated by a combination of wide surgical removal of the growth with free use of methods of radiation.

Mr. SYDNEY FORSDIKE said that it was of small value to know the weight of radium used and the length of time for which it was employed unless the nature of the screens used was also known. It had been shown that the hard beta ray, *plus* the gamma ray, was approximately eight times as potent as the gamma ray alone. He believed that the best way of treating deposits in the cellular tissue and pelvic glands was with the hard *x* ray. Better results were claimed for the treatment of the local disease with radium alone. The question arose whether radium should not be used at an earlier stage of the disease.

Mr. GORDON LUKER said that for the past two years he had been inserting 50 mg. of radium into the cervical canal for thirty-six hours, from one to seven days before the operation. In nine cases followed up from nine months to two years there had been, so far, no local recurrence. In a few other cases another application of radium had been given three months after the operation. In doubtful cases he had seen the growth almost disappear, so that operation could easily be performed later.

Dr. DONALDSON stated that the subject of radium treatment for carcinoma of the cervix was being investigated by Dr. Canti and himself on behalf of the gynaecological department at St. Bartholomew's Hospital. So far fifty-five cases had been treated, and the majority were benefited for a time. In his opinion it was much too early to discuss the ultimate value of the treatment. The carcinoma could be destroyed

locally in the cervix, but the problem remained how to free the parametric tissues and glands. At present he was trying two methods: (1) deep radiation by the operation invented by Doel (of Ghent), (2) *x*-ray treatment. The most urgent need at present was a scientific basis for dosage. He was doubtful whether the biological effect was the same when the amount of radium was doubled and the duration of exposure halved. A chart of the histological findings, drawn up by Dr. Canti, suggested very strongly that the time factor and distribution of the radium were perhaps more important than the quantity of radium.

X-RAY TREATMENT OF MALIGNANT DISEASE: CLINICAL RESULTS.

A DISCUSSION on clinical results of treatment of malignant disease by *x* rays took place at the Medical Society of London on January 22nd. It was preceded by an exhibition of cases.

Lord DAWSON, who presided, said that the Council of the Society had chosen this subject for discussion, feeling that the progress made in radiotherapy was such that it would be useful to take stock of the position. It had been decided to narrow the discussion to true malignant disease—mainly carcinoma—and to concentrate it on the clinical results, avoiding as far as possible descriptions of technique.

Dr. ROBERT KNOX then read a paper in which, after citing cases in support of his conclusions, he said that he still felt, modern improvements in *x*-ray technique notwithstanding, that in all cases of malignant disease in which a complete surgical operation was possible operation should be the first procedure, but that afterwards the patient should have *x*-ray or radium treatment of the most thorough kind. These radiations were of great therapeutic activity, and were extremely helpful in the treatment of malignant cases, but up to the present there was no clear indication that they were in any sense a specific cure for these conditions. While the primary growth could be treated and apparently cured, recurrences were almost inevitable. These, if superficial, could be dealt with by the same agent, but the deeper metastases were beyond the reach of radiation. He mentioned a case of epithelioma of the tonsil and pharyngeal wall which showed a noteworthy result under *x*-ray treatment, but two years later there was a recurrence at the original site, and then the treatment by the same technique failed to produce any good effect, and was followed by much sloughing of the evidently devitalized tissues. Several cases of carcinoma of the oesophagus had done well for a time under radium or intensive *x*-ray treatment. He had had no good results in the limited number of gastric cases he had treated. Cases of rectal carcinoma improved as a result of deep radiation, but there were no cures, nor anything approaching cures. It was important in all cases to watch the skin carefully. In the radiologist's zeal to obtain a maximum effect the skin was often damaged. Severe burns had followed upon intensive treatment. Certain manifestations of overaction might be long delayed. In the treatment of carcinoma of the breast or chest wall the pleurae and lungs might be damaged; he had seen thickening of the pleura follow heavy *x*-ray treatment. On two occasions lately he had escaped disaster in the treatment of abdominal conditions by giving a short preliminary exposure to ascertain the patient's response to radiations. One patient, after a short exposure to the region of the epigastrium, suffered from troublesome vomiting, followed by a slow recovery, and in ten days' time had a sharp reaction with general malaise. Dr. Knox was now trying a method of dividing the total dose over six sittings, and found that, especially in breast cases, the result was satisfactory.

The essential feature of the new methods of intensive radiotherapy, known as Erlangen methods, Dr. Knox said, was the employment of a more penetrative ray and an increase of the initial dose. It would be some time before the results obtained by this method could be accurately appraised. The use of the more penetrating rays for a longer time did sometimes cause a rather quicker response, but the new method was attended by greater risk to the patient, and decidedly more discomfort, and in many cases, with patients already debilitated by disease, it was too dangerous to use. He emphasized the value of *x* rays in prophylactic treatment, where they rendered very useful aid to the surgeon. One patient whom he had seen that day had undergone the operation fifteen years previously. There had been a previous recurrence in which the masses yielded to intense *x*-ray treatment, and the treatment in this second recurrence bade fair to be equally satisfactory. The recurrence was of carcinoma in the scar of the operation. In another patient, also seen that day, the operation had taken place twelve years previously. He strongly urged the general adoption of post-operative treatment by *x* rays or radium or both combined.

Mr. SAMPSON HANDLEY believed that in the treatment of cancer both surgery and radiotherapy were essential, and that each by itself was comparatively useless. He agreed strongly as to the value of prophylactic treatment by radiations. During the last fifteen years he had made it a rule that cases of breast carcinoma on which he had operated should have a subsequent course of treatment by *x* rays, and almost all the superficial recurrences just under the skin which had occurred in his experience were in the few cases which for one reason or another had escaped this prophylactic course. Surgeons ought to be very grateful to radiologists for the attempts they were making to deal with cases in which surgery was useless, though he could not help thinking that the claims made for the new methods of radiation in some quarters were excessive.

Dr. REGINALD MORTON said that it was less than the truth that 95 per cent. of the cases of malignant disease brought to the radiologist were brought to him only because they were too far advanced for any other measure. The question of the *x*-ray treatment of malignant disease resolved itself into one of dosage. It was well known that there were several ways of administering *x* rays. As between a fractional dose method and the administration of the full dose in a single sitting his preference would be for the latter. A great deal was heard about extravagant claims for intensive *x*-ray treatment, but it would be found that such claims were not made by the people really responsible for treatment by the Erlangen method. As to the dangers of this treatment, there should not be, with proper technique, any severe reactions on the skin. In any case, the reaction following overdose of the type of radiation now in use had little in common with the *x*-ray burn so rightly dreaded. In the course of his own work with intensive radiation during the last two years it had happened twice that a patient, unobserved, had made a movement during treatment, and got a double dose on a particular field. The patch was sore and unpleasant, but it healed up; it was quite a different lesion from the old-fashioned burn obtained with more or less unfiltered rays. A great deal had been heard lately about anaemia following radiations. He and a colleague had done many hundreds of blood counts on persons subjected to *x*-ray treatment, and it was very rare to find a case in which the red cells were reduced by more than about 5 per cent. The diminution of red cells was not found to anything like the extent sometimes suggested.

Mr. LOCKHART-MUMMERY said that his experience of the new Erlangen method amounted to only five or six cases. He had hoped a great deal from it, but he did not think it was going to be of very great assistance. *X* rays, like some other methods apart from operation, would occasionally cure cases of cancer. He had seen a patient cured of unquestionable cancer by arsenic, and two others cured apparently by colloidal copper. The truth was that the vitality of the cancer cell was rather below that of the normal cell; in carcinoma the margin was very narrow, in sarcoma rather wider. If, therefore, the cancer cell could be devitalized by any agent from whose poisonous action the normal cells were immune, the growth would be cured. Those who had been cured of cancer by arsenic were people who were tolerant of arsenic—a tolerance not shared by their cancer cells. *X* rays had the same result if a dose could be discovered which would kill the cancer cells in a given patient without harming the neighbouring cells. The whole problem was the gauging of the dose, which was extremely difficult. One of his patients, whose normal tissues were no doubt particularly susceptible to *x* rays, had died, following Erlangen treatment.

Dr. GILBERT SCOTT said that to tackle the problem of the treatment of cancer by radiation some technique must be devised which would not only destroy the primary tumour—on which all their efforts were apt to be concentrated—but would check the spread of the growth also. The fault of present-day methods was a too local application. His impression was that the destruction of the secondary cells required very small doses. With regard to blood changes, he believed that serious blood changes in patients receiving radiation treatment were a sign of overdosage. He himself would not use the word "cure" in connexion with malignant disease; he had seen a recurrence in the sternum twenty-two

years after the removal of the breast. But the value of *x*-ray treatment should not be assessed merely on the ground of its capacity to kill a tumour; *x* rays, even when they effected nothing like a cure, often brought an immense comfort and relief to the patient.

Dr. DOUGLAS WEBSTER said that radiation might have one of three aims: (1) prophylactic, in collaboration with the surgeon; (2) palliative, in inoperable cases; (3) curative, in a very small number of cases of malignant disease, apart from superficial epitheliomata of the basal-cell type, where a good proportion of success might be looked for. An American radiologist recommended that in cases of superficial epitheliomata the patient after a clinical cure should report every six months for five years, so that any slight recurrence might be detected immediately. Spino-cellular epitheliomata were very much more resistant to radiation, yet many cases were reported cured. He gave some examples of the pitfalls and difficulties of the statistical method of approach. For example, in Frankfort the death rate from cancer in 1918 and 1919 was given as 21 per cent., and about the same in Munich, but in Berlin, Leipzig, and Hamburg it was said to be about 60 per cent.

Mr. GORDON TAYLOR said that he believed in the prophylactic value of the post-operative treatment of cancer by *x* rays, and for the past twelve years all the breast cases on which he had operated had been so treated. He had gone farther and had introduced radium into the area at the time of the operation, but with unfortunate results. He placed radium (50 mg.) generally into the second and third intercostal spaces, and left it there for six or twelve hours, but about eighteen hours after the operation many of these patients suffered extreme shock, and there was no difference in his technique to account for it save the insertion of these tubes of radium.

Dr. J. E. A. LYNHAM gave some account of the results of the Erlangen method, with fractional doses, as employed at the Cancer Hospital. The results so far as they had gone had sufficed to show that the new treatment would be valuable in a certain number of cases. After the first dose he could nearly always tell, within a few days, whether or not the patient was going to do well under the treatment; patients who were going to do well looked and felt better from the start. Another point was that with the same set voltage, milliamperage, and distance there was a considerable variation in the skin reaction. The average patient got a very faint erythema, some patients got bronzing, and a fair number showed no skin reaction at all. It was not safe to base a deep-therapy dose on what appeared to him to be a widely varying factor. The impression must not be conveyed, in discussing the *x*-ray treatment of carcinoma, that there were good results in a large percentage of cases. But surgeons who spoke in a disparaging way about radiology lost sight of the fact that the radiologist usually had to deal with the failures and the hopeless cases. When the radiologist did see a case which was a good one for radiotherapy, but at the same time was operable, he always referred it first to the surgeon. The speaker did not believe in giving prophylactic doses until the patient had got over the shock of the operation; therefore six or eight weeks' interval usually elapsed before radiation was begun. He mentioned one case, obstinate to radiation, of which he heard that the nodules had disappeared in a remarkable manner following upon the patient's visit to Lourdes, but the disease came back again, and the patient died. The case suggested the power of mind over disease, and he thought there was a lesson in it for surgeons, who when they referred patients to the *x*-ray department might well do so in a tone, not of despair, as too frequently happened, but of hope and encouragement.

Dr. KNOX, in replying on the discussion, said that with the small quantity of radium used in Mr. Gordon Taylor's cases, and with the short exposure, he had never seen anything like the reaction of which Mr. Taylor had spoken. He deprecated, with some other speakers, the extravagant claims made for the Erlangen method. These claims were not made by those who were actually practising that method. He thought that *x*-ray technique was capable of much greater improvement, perhaps even of revolution. He had sometimes imagined that its future would involve the use of a whole battery of *x*-ray tubes, so that the patient would be, so to speak, exposed to an *x*-ray bath. Some such means of procuring a widespread action on the tissues was well worth investigating.

PAROXYSMAL TACHYCARDIA.

AT a meeting of the Medical Section of the Royal Academy of Medicine in Ireland on January 5th, with the President, Dr. T. GILLMAN MOORHEAD, in the chair, Dr. LEONARD ABRAHAMSON read a paper on two cases of paroxysmal tachycardia (with electrocardiograms). He remarked that the term "paroxysmal tachycardia" had been applied to various conditions differing essentially in mechanism. In dealing with a sudden acceleration of the heart rate, it was imperative to avoid confusion, to specify where possible the exact mechanism. Thus a case might belong to one of four groups: (1) paroxysms of simple or sinus tachycardia; (2) paroxysms of auricular fibrillation; (3) paroxysms of auricular flutter; (4) paroxysms of extra-systoles. Where the mechanism of a paroxysm was obscure the diagnosis had not been made, although one might be able to decide from certain clinical criteria, such as sudden onset of attack, unchangeable rate, and sudden termination, whether one was dealing with a paroxysm of abnormal tachycardia or with a paroxysm of normal tachycardia. The first case exemplified a paroxysm of extra-systoles.

The patient, a female aged 22, who presented a stenosis and regurgitation of the mitral valve, when first seen was suffering from a paroxysm of tachycardia, which had commenced abruptly on the previous day. Electrocardiograms showed a series of extra-systoles, rate 200 to 205 to the minute. Whilst the tracings were being taken the attack stopped abruptly with a long pause, but recurred in a few moments. The interparoxysmal period showed a large number of extra-systoles arising from different foci, some in the auriculo-ventricular node, with others in the auricle above the node; the paroxysm itself was believed to spring from a low level in the node.

The second case demonstrated a paroxysm of auricular fibrillation, rate 170 to 180, occurring in a male aged 58, the subject of advanced myocardial disease. The tracings were shown in order to demonstrate the difference in the mechanism of that paroxysm and of the preceding one. After the subsidence of the attack the patient developed a chronic auricular fibrillation.

The PRESIDENT said that he had recently seen a case in which the patient was immediately able to check the tachycardia by pressing deeply on each side of his neck.

Milk Anaphylaxis.

The PRESIDENT read a note on milk anaphylaxis, using the latter term as signifying a special sensitiveness on the part of some patients to milk. He registered a protest against the almost universal and indiscriminate use of milk in cases of gastric disorder, and pointed out that in many cases the use of that fluid merely aggravated the condition which it was intended to cure. Cases illustrating his contention were reported, including one case in which, after two operations had been performed and nothing wrong had been found in the abdomen, relief was immediately obtained by stopping all milk food. On one or two occasions milk was given accidentally during the progress of the case, each time followed by the occurrence of acute gastric pain and vomiting.

Sir JOHN MOORE said that in cases of enteric fever he had often seen milk acting as a poison, and in such cases he had substituted whey and egg water; raw meat juice and port wine were also good substitutes.

Dr. L. ABRAHAMSON had known of a case of mucous colitis, which had been treated medically, *x*-rayed, and operated upon and was no better, having been on a milk diet for about two years. The patient was then put on meat juice, after which he made a complete recovery, while appendicectomy and other measures had done him no good at all. Dr. PERCY KIRKPATRICK said that Dr. Tweedy had regarded milk as the worst form of food which could be given to a patient suffering from eclampsia, as he regarded eclampsia as a form of anaphylaxis due to milk poisoning. Dr. T. J. D. LANE was of opinion that the great point in those cases was to find out, when milk disagreed, if it was due to anaphylaxis or not. If the patient gave an anaphylactic response to ordinary milk, and not to boiled milk, he thought that was a point in favour of anaphylaxis.

Dr. G. E. NESBITT, Dr. H. F. MOORE, Dr. KENNEDY CAHILL, Dr. R. J. ROWLETTE, and Dr. C. PILE also took part in the discussion.

Renal Efficiency Tests.

Dr. G. E. NESBITT read a note on renal efficiency tests, and demonstrated three which he had found most serviceable—namely, the urea concentration test, the estimation of blood urea, and the excretion of phenolsulphonephthalein. He had followed, for the most part, the methods and technique recommended by Professor H. Maclean, and he could testify to their

excellence. It was only fair to say that any of Maclean's methods he had tried had been equally satisfactory. Acting on suggestions of Professor Caldwell he had made some minor alterations in the estimation of blood urea which he thought were decidedly advantageous; one was the addition of a side tube by means of which alcohol could be added at any time to control frothing, and another was the immersion of the blood tube in a jacket of warm water during distillation, which brought over the ammonia much more thoroughly and quickly. As regards the value of the tests, he thought that no just opinion could be expressed in a doubtful case of nephritis based on ordinary findings alone, nor should serious genito-urinary surgery be undertaken until the condition of the kidneys had been ascertained by some such means as these tests. Not the least value of the tests was the possibility of demonstrating sound renal function in cases which had been rejected for life insurance, or had been treated as chronic invalids on account of the presence of albumin and even casts in the urine.

Dr. H. F. MOORE said that the tests should be carried out in conjunction with the ordinary physical examination of patients. Care should be taken to use an efficient colorimeter for the phenolsulphonephthalein test.

Dr. V. M. SYNGE had found the curve of water excretion a very simple and reliable guide in these cases. Mr. C. E. BRUNTON had carried out a critical examination of the blood urea estimation in conjunction with Dr. Fearon with a view to the discovery of fallacies, and they had found several; Dr. Nesbitt, working independently, had come to the same conclusions. He thought the use of the warm water jacket was new and an important addition to the technique.

"LUNG SPLINTING" FOR PULMONARY TUBERCULOSIS.

A MEETING of the Ulster Medical Society was held in the Medical Institute, Belfast, on January 4th, with the President, Professor R. J. JOHNSTONE, F.R.C.S., M.P., in the chair. Dr. S. H. STEWART read a paper entitled "Some preliminary observations on lung splinting in the treatment of pulmonary tuberculosis." He said that rest was a fundamental factor in the treatment of all forms of tubercle, and pointed out many facts drawn from different sources in support of that aphorism. The operation for letting in a gas to the pleural cavity and thus giving the lung complete rest was not always feasible. Dr. Stewart then demonstrated practically, on an assistant, his method of "lung splinting," and showed the mechanical reasons for the various adjustments. He gave notes of some cases which he had treated by the apparatus, with statistics taken before and afterwards. All the patients wore the apparatus without inconvenience, and were benefited.

The PRESIDENT asked whether pulmonary tuberculosis was always primary and whether *x*-ray examination had been made to ascertain the amount of diminution of movement.

DRS. HALL, RANKIN, CALWELL, TRIMBLE, MCKISACK, BURNS, and FOSTER COATES joined in the discussion. The chief points raised included the question of tissue susceptibility, and whether movement acted simply as a mechanical distributor. It was pointed out that the meninges were the least mobile part of the body and yet tuberculous infection was always fatal, and that high altitudes involved increased lung action and yet brought cure. The suitability of the apparatus for girls of rather frail physique was questioned. Congratulations were offered to Dr. Stewart for the ingenious manner in which he had met the various difficulties and mechanical complications.

Dr. W. L. STORY read a witty paper on "Some realms of gold untravelled yet by vaccine therapists," which was much enjoyed by the members, and the Chairman expressed the thanks of the meeting.

A MEETING of the London Association of the Medical Women's Federation was held on January 15th, with the President, Dr. LOUISA MARTINDALE, in the chair. Dr. ESTELLE COLE, in a paper on the psychology of Freud and its application, defined certain basic ideas of the Freudian psychology and the use of the terms "conscious," "preconscious," and "unconscious." She described the biologic non-moral aims of the individual as expressions of the unconscious. These aims, being in conflict with the morality of civilized society, were repressed, the continual warfare giving rise to "conflict." Dr. Cole emphasized the Freudian doctrine of psychical determinism, or the causal determination of ideas and symptoms, and discussed the wide interpretation of the term "sexual" introduced by Freud. She described the dream as the preserver of sleep, and argued that the pictorial representation, or symbolism, of the dream was not the confused jumble that it appeared on superficial examination. The Freudian method of analysis was then described, and a list of abnormal conditions benefited by analysis was given.

Reviews.

SCIENCE AND HUMAN AFFAIRS.

THERE can be no more enthralling subject for study than the persistent progress of human thought through the ages. "Persistent" is the right word; it might even be amplified to "irresistible," for the more deeply the matter is pursued the more apparent does it become that the golden thread of progressive thought has never been broken, and that it traversed even the Dark Ages. This point is well brought out by Dr. WINTERTON C. CURTIS in his book *Science and Human Affairs*,[1] the earlier chapters of which are devoted to the demonstration of this fact of continuity. The author is primarily concerned with the birth and growth of scientific thought and knowledge, and traces this development with a wealth of interesting and deftly used detail. He shows the gradual ascent of natural knowledge—that is, knowledge gained by observation of natural phenomena, fearless knowledge, neither mystery-ridden nor with knees bent in deference to false authority, but moving steadily forward with open eyes and open mind. So free a spirit must inevitably meet with obstruction, but, if it is truly scientific, it knows not despair nor dismay. From all its trials it has emerged with increased strength until to-day it finds some place in almost every system of Western thought, and is a part of every rational thinker's mental equipment.

The foundations of practical science seem to have been laid not later than 4500 B.C. in earliest civilized Egypt, culminating in the great Pyramid Age (3000–2500 B.C.). But the Egyptian, despite the wonder of his achievements, was limited in his thinking and had little power to generalize. It was left to the Greek to abstract and generalize, and to grasp the principles underlying the product of human eyes and hands; it was he who sowed the seed of modern scientific thought. The Roman period was more notable for practical accomplishment than advance in thought; and with the advent of the early centuries of the Christian era certain fundamental social changes, and antagonism to pagan culture, were responsible for the decline of science, which by this time had lost its initial impetus. But it survived the self-delusion and obtuse authority of the Middle Ages, and by 1450 had recovered its independence. Men awoke to the truths of natural science, and rapid advance became possible. In the succeeding centuries numerous societies and academies arose (the Royal Society of London was incorporated in 1662) which were not part of the formal educational system of the period. The isolation of scientific workers was thus ended and their solidarity established. Henceforward the march of science was steady and sure.

Dr. Curtis is a biologist, and his historical review of science in general, in Part I of the book, leads to an exposition of modern biological science in Part II. The cell doctrine, the theory of organic evolution, and the growth of zoology are discussed with the authority of an expert. The author lays stress on the many points of contact between biology and medical science. "The more scientific medicine becomes," he writes, "the greater will be its demands upon zoological science." This section of the book is rich in detail and does not admit of summary; it must suffice to say that it is the keystone of the work as a whole.

Part III is on the present importance of science, and it is here most particularly (though Dr. Curtis never loses sight of his main thesis) that the book lives up to its title. This part may be summed up as a plea for, and a justification of, the scientific spirit and point of view in all branches of human activity. The case is stated with manifest sincerity and conviction. The author has unbounded faith in the capacity of the scientific mind to secure ever-increasing benefits for mankind, to clear away the fog of speculative thought, to bring mystery into the open light of day, and to throw a beam into all dark places. He asks for more science in philosophy,

[1] *Science and Human Affairs from the Viewpoint of Biology.* By W. C. Curtis, Ph.D. London: G. Bell and Sons, Ltd. 1922. (Demy 8vo, pp. vi + 330; 30 figures. 15s. net.)

in law, in art, in sociology, and in education, believing that nothing but good can result. These chapters are provocative of thought, and are written with skill and breadth. They will no doubt excite opposition in the minds of many readers who have not had a rigorous scientific training. Dr. Curtis's plea for the open mind should disarm them. Wherever science is, he contends, there also is progress.

"The scientist believes that his rationalistic method offers a means of moving forward which sets no limit and sees no end. . . . New and more difficult problems arise from each problem solved. . . . Things undreamed of in our philosophy continually appear."

A remarkable and notable book, the product of prolonged thought and painstaking care in the selection and marshalling of material. It is worthy of a permanent place in the library of every thinker.

PSYCHOLOGY AND THE PARENT.

DR. H. CRICHTON MILLER has written a volume on *The New Psychology and the Parent*,[2] based on a course of lectures given in connexion with the Tavistock Clinic. He expresses his views clearly, and there is nothing in his book that the educated layman should fail to understand. He discusses the outstanding particulars in which parents are apt to fail in bringing up their children; explains his conception of the unconscious and the meaning of dream symbolism; and gives an account of his views as to the origin and function of the "herd" instinct. The concluding chapters dealing with the religious education and sex instruction of children will perhaps be of special interest to parents, because these questions are often felt by them to constitute a serious problem.

Dr. Miller's views approximate to those of the Zürich school, and his teaching is based largely on the assumption that the human being is endowed with ethical and religious instincts. Many psychologists would regard this assumption as more than doubtful, and the tendency in the volume to evaluate the various impulses of the human being gives rise to the impression that the New Psychology, as here outlined, has overstepped the legitimate boundaries of psychology and strayed into the regions of ethics and mysticism. Apart from any question of theory there would seem to be a certain danger in the psychopathologist assuming the place of a spiritual director. He will tend to regard some forms of behaviour as "better" than others and judge his patients according to whether they are doing good to others or not. We would suggest that Dr. Miller exhibits this tendency when he expresses the view that the young man who becomes a scoutmaster is embracing magnificent opportunities for sublimating his social or parental instincts, whereas the young man who devotes all his spare time to golf is merely working off a certain amount of physical energy. We think it is justifiable to make the criticism that Dr. Miller is here assuming the parental attitude to the young man that he very properly warns parents against. Is he not tending to stand between the young man and self-realization—to obstruct his psychological freedom?

Though there is much in this book that is somewhat speculative from the standpoint of psychology it contains some excellent advice, and it may be safely recommended to parents and teachers.

TREATMENT BY SUGGESTION.

IN his modest volume on "*Suggestion*" *and Common Sense*[3] Dr. R. ALLAN BENNETT develops the view that no ailment, organic or functional, is beyond the reach of help by suggestion, provided that the patient is capable of exercising the requisite intelligence. The author is thus a firm believer in the value of suggestion, though he does not claim personally to have observed any more than its elementary applications. Theoretically, however, he would place no limitations on its possibilities as a therapeutic agent, and he can see no logical objection that can be brought against the assumption that laws exist permitting the readjustment of any relations disturbed by disease. In a thoroughly practical chapter Dr. Bennett states how he carries out the treatment of his cases by suggestion.

The author does not accept a mechanistic interpretation of life, and in the opening chapter he expounds his conception of the living organism as a self-directing unit, endowed with not only the power but with the will to develop. In the preface he explains that, acting on the advice of the late Dr. Charles Mercier, he decided to drop psychology and apply the principles of common sense to medicine. We do not think psychology is quite so remote from common sense as the author would seem to imply. Indeed, the sound and clearly expressed views as to the source of consciousness, and the function of the individual cell and its relations to the organism as a whole, contained in this volume embody in somewhat different language the most recent psychological teachings.

It may be that some readers of this volume will be unable to accept the beliefs of the writer in their entirety, but it is a book which can be safely recommended to the medical practitioner. It is clearly written, breathes a spirit of optimism, is free from technical phrases, and holds the attention of the reader.

HEREDITY IN MAN.

WE have received a copy of the first volume of a book on heredity in man by three German authors[4]; the intention seems to be that when complete it shall be a comprehensive treatise on general biology in its applications to medicine.

The subject of variation is dealt with in the first section by Professor Dr. ERWIN BAUR of Freiburg, who groups the principal causes of variation under three headings: (1) Paravariation, or variation by modification in idioplasmatic individuals who have grown up under similar external conditions; (2) mixovariation, resulting from the union of individuals who are not idioplasmatic; and (3) idiovariation, which is practically the same as what is generally known as mutation. The instances given in exemplification of the different types are mostly known to biologists. Professor EUGEN FISCHER discusses variations of the human body in different races of mankind from the anatomical and anthropological standpoints. Dr. FRITZ LENZ contributes two sections, which occupy rather more than half the volume. Dr. Lenz defines "illness" as the condition of one who lives on the limit of the possibilities of adaptability, and "perfect health" as the state of complete adaptability. The causes of illness are to be found neither exclusively in environment nor in heredity, though one or other of these usually predominates. The latter is considerably more evident in diseases of the mind than in other disorders; syphilis and alcohol occupy secondary, but nevertheless very important, positions. Dr. Lenz tentatively distinguishes as a true "mental" disease one of sufficient intensity to prevent a person from following his vocation, lesser degrees being regarded as "psychopathic." This is admittedly but a rough and ready division, but no idiotypical division is as yet possible. He agrees with Goddard that heredity is responsible for two-thirds of the cases of insanity, since in America alcoholism can be ruled out. Such a conclusion appears to be somewhat premature. Syphilis is stated to be less prevalent in America than in Europe.

Many mental diseases are dealt with, some at considerable length, from the standpoint of hereditary causation. The amaurotic idiocy which occurs sporadically amongst the Jews is considered to be homozygotic and recessive and therefore not a racial tendency. Schizophrenia or dementia praecox is regarded as the most important mental disease next to paralysis of syphilitic origin, and heredity is its only known cause. Rudin's analysis of cases is quoted, but the evidence as to whether this disease is of a recessive character or not is by no means conclusive. In discussing epilepsy reference is made to Steiner's statistics, which are held to show that there is a connexion between this disease and left-handedness.

Hysteria is defined by Dr. Lenz as a more or less unconscious and involuntary imitation of forms of illness; the patient need not necessarily have seen the form of illness which is imitated, but gives to it the form he imagines it would take. Hysteria is regarded as a form of mimicry, and analogies are drawn with types of mimicry among animals, such as insects feigning death, the hen partridge pretending she cannot fly in order to attract attention away from her young, etc. Such analogies appear to be rather forced, as the instances of mimicry given are clearly protective and the results of accumulative experience. It is difficult to believe this to hold good in hysteria; more particularly as the author limits the term to the *involuntary* imitation of forms of

[2] *The New Psychology and the Parent.* By H. Crichton Miller, M.A., M.D.Edin. and Pavia. London: Jarrolds, Ltd. 1922. (Cr. 8vo, pp. 255. 6s. net.)

[3] "*Suggestion*" *and Common Sense.* By R. Allan Bennett, M.D.Lond., M.R.C.P. Bristol: John Wright and Sons, Ltd.; London: Simpkin, Marshall, Hamilton, Kent, and Co., Ltd. 1922. (Cr. 8vo, pp. 105. 6s. net.)

[4] *Menschliche Erblichkeitslehre.* Band I. By Professor Dr. Erwin Baur, Professor Dr. Eugen Fischer, and Privatdozent Dr. Fritz Lenz. München: Lehmann. (Med. 8vo, pp. 305; 65 figures.)

disease; he proposes the word "orgoristia" for determined imitation and suggests that paranoiac-mental derangements are closely related.

The section of the book which deals with the relation of mental endowments and psychopathy is of considerable interest, though some of the generalizations verge on the humorous or the alarming. The mental condition of such men as Rousseau, Wagner, Neitzsche, Darwin, Mohammed, Napoleon, and others remarkable for great mental endowments, is discussed. Great poets, artists, philosophers, and politicians, in fact all with high mental abilities, with the exception apparently of research workers and discoverers, are, according to Dr. Lenz, the victims of orgoristia. Goethe's family is given as an example of the tendency to mental derangement in the other members of the family of talented persons. It is, as the author admits, a painful thought that the deeds and mental output of those whom we have been accustomed to regard as mental heroes should have sprung from a tainted stock. Perhaps Dr. Lenz is mistaken. As far as it is possible to understand the conclusions arrived at, they appear to be as follows: that, so long as the idea of disease is connected with the preservation of the individual we cannot acknowledge a connexion between genius and disease; but, if such idea be connected with the preservation of the race, the question at once assumes another aspect. The creative activity of the genius may help the life of the race, and, though it may injure individual preservation, be thus beneficial. A population of geniuses would be incapable of continuing to exist; but the sporadic occurrence of genius is of vital importance to the race in order that new avenues of life may be opened up. These later sections of the book make difficult but interesting reading, and may be taken to justify a hope that much may yet be done along this line of inquiry. The general impression left on the mind of the reader, unless he happens to be a superaltruist, will be that one would much prefer to leave the possession of genius to the other fellow.

A FRENCH TEXTBOOK OF NEUROLOGY.

A SERIES of manuals is appearing in Paris, under the general editorship of MM. Gilbert and Fournier, intended to form a library for the degree of Doctor in Medicine. We have before us the two volumes of this series devoted to the diseases of the nervous system.[5] The author, Dr. HENRI CLAUDE, is to be congratulated on the successful issue of his task. Into these two volumes, containing together some fourteen hundred pages, he has managed to compress a very full and fair account of the present state of knowledge. Diseases of the brain and its meninges form the subject of the first volume, and in the second the diseases of the spinal cord, the system diseases, the diseases of the peripheral nerves and muscles, disorders of the sympathetic nervous system, and the various neuroses are considered.

The volumes as a whole may be recommended as a valuable and up-to-date textbook. The production of a single pen, it has gained by the absence of overlapping and inequality in treatment of different subjects, which is a common fault in some textbooks.

Probably the most valuable feature of the book, at least to the neurological student, are those sections which deal with general symptomatology and with the various syndromes or clinical pictures whose characters and interpretation are well described. There is, for example, an excellent account of aphasia and apraxia; a concise description of Wilson's disease and of other diseases of the corpus striatum is included. Though detailed criticism is impossible we may mention that the account of epidemic or lethargic encephalitis appears to us unsatisfactory and inadequate, especially in view of the increasing frequency and importance of its various sequelae.

The value of the volumes would have been enhanced had more space been given to anatomical and physiological descriptions, and particularly by the provision of more and better anatomical plates; the other illustrations are better and in many respects very valuable.

In conclusion, and from the point of view of the English reader, a tribute of praise and thanks is due to the author for a style and a diction which are both lucid and pleasant, and should go far to obtain for these volumes a wide circulation in this country.

[5] *Précis de Pathologie Interne. Maladies du Système Nerveux.* Vols. I and II. By Dr. Henri Claude. Bibliothèque du Doctorat en Médecine. Published under the direction of A. Gilbert and L. Fournier. Paris: J.-B. Baillière et Fils. 1922. (Post 8vo. Vol. I, pp. xi + 549; 79 figures; fr. 20. Vol. II, pp. xi + 880; 170 figures; fr. 30.)

THERAPEUTIC NOVELTIES.

THE thirty-fifth annual report of Messrs. Merck[6] of Darmstadt upon the pharmacological action of new drugs has been issued. These reports were printed in English as well as in German before the war; at present they appear only in German, but it is stated that next year an English edition will be produced.

The present volume mentions about 700 drugs, and gives about three thousand references, the great majority of the latter referring to work published in the year 1921. The references are obtained from about 400 journals published in about twenty-five different countries. These figures indicate the scope of the work and its value to anyone who wishes to find out quickly what has been written about some new drug.

The report commences with a special article of eighty-one pages on the chemistry of glucosides, dealing with the glucosides used in medicine other than the glucosides of the digitalis group. The rest of the work consists of short summaries of the literature which appeared in 1921 concerning the drugs dealt with; the summaries are uncritical, and hence the general impression given is that there exist a surprisingly large number of universal cures. This, however, is due to the poor quality of the literature dealt with, and is not the fault of the compiler.

The following are a few points worthy of mention: Two and a half pages are devoted to the new trypanocidal agent "Bayer 205," and fifteen references are given. No reference is made, however, to the new American arsenical trypanocide named tryparsamide. This suggests that the volume is more reliable for German than for non-German drugs. The subject of protein therapy occupies twelve pages, and seventy references are given; needless to say, the clinical effects reported are startling, and that cures of the majority of diseases are reported. The present state of this treatment is indicated, however, by the fact that there is no agreement as to whether the doses administered should or should not be sufficient to induce fever.

Some interesting references are given to the action of quinine upon the uterus. The conclusion arrived at is that quinine does not excite the normal pregnant uterus, and therefore will not act as an abortifacient in a healthy woman, but that it will excite the uterus in pathological conditions, and also will strengthen the uterine contractions in labour. The use of iodine as a general internal antiseptic is being revived, and it is even recommended as a specific in tuberculosis. Pregl's solution, which contains 0.04 per cent. iodine together with iodides and hypoiodites in watery solution, is recommended as a general disinfectant for local use and also as a general internal disinfectant for intravenous injection. Beneficial results are reported in encephalitis lethargica, disseminated sclerosis, tabes, epilepsy, arterio-sclerosis, puerperal fever, and other diseases. As already mentioned, the report gives non-critical summaries.

These are only a few haphazard examples of the subjects dealt with in the report, but they suffice to indicate the very large amount of information that has been collected; of the value of the information the reader must judge for himself.

[6] *E. Merck's Jahresbericht über Neuerungen auf den Gebieten der Pharmakotherapie und Pharmazie, 1921.* XXXV Jahrgang. Darmstadt: E. Merck. November, 1922. (Demy 8vo, pp. 492.)

THORPE'S DICTIONARY OF APPLIED CHEMISTRY.

THORPE'S *Dictionary of Applied Chemistry*[7] possesses all the merits befitting an encyclopaedia of chemistry. The new edition has reached the third volume; the subjects dealt with extend from Explosives to Kyrofin, which we are informed is the trade name for a substituted anilide used as an antipyretic; this is an example of the book's comprehensiveness, for the substance can have no interest beyond the historical fact that it appeared at some time among the synthetic products offered for therapeutic use. The appearance of a monograph on krypton demonstrates the same quality. The objection might be raised that a dictionary of applied chemistry should not include accounts of substances such as krypton, which have only an academic interest, but the fact that any observations on general chemistry may some day form a part of applied chemistry affords good reason for their inclusion. At the other extreme,

[7] *A Dictionary of Applied Chemistry.* Vol. iii. By Sir E. Thorpe, C.B., LL.D., F.R.S., assisted by eminent contributors. Revised and enlarged edition. London and New York: Longmans, Green, and Co. 1922. (Med. 8vo, pp. viii + 735; illustrated. Vol. iii, £3 3s. net.)

monographs on materials like flax and hemp are not out of place, though they afford little opportunity for chemical discussion; their industrial importance justifies the description of their botanical origin, of the microscopic and physical characters of the fibres, and of the mode of preparation and uses of the products. It is pointed out that though water in which hemp has been steeped produces no evil effects on the health of the district, it destroys fish together with certain vegetable growths when allowed to flow into running water. In an interesting article of 300 words on flagstone we read the curious statement that one of the great factories of meat extract on the River Plate is floored throughout with flags exported from Caithness. The discursiveness of the articles is further exemplified on page 461, where under iodine we find a list of some fourteen marine products, showing their content of iodine; among them are oysters with 0.00004 per cent. and mussels with 0.03 per cent.

Encyclopaedias are sometimes said to make pleasant fireside reading on account of the wealth and variety of information given, but to be of no use for the thing wanted when occasion demands. The statement contains a certain measure of truth, but it admits equally of the construction that great services give rise to greater expectations. It is manifest, however, that the value of such a work would be greatly increased by the compilation of a supplementary volume containing a full index to incidental references, since a great number of these occur under headings not likely to lead to their immediate discovery. The subjects of greater importance receive appropriately extensive treatment, purely scientific matters being no less generously dealt with than those which have attained great industrial importance. There is a discourse on flame deserving to rank as a classical treatise written by one who is not only a successful research worker on the subject but also gifted as a writer. The article should be read by every student of chemistry. The same may be said of the article on hydrolysis. Many of the monographs contain sufficient matter to make separate volumes, notably those on explosives, fertilizers, fuel, gas, and glass. Coal gas is reviewed from many standpoints; of technological interest are the reviews of air gas, oil gas, and water gas; the substances used in gas warfare are noticed. The characteristics and the structural constitution of dyestuffs are reviewed as completely as it is possible to expect in a general dictionary of chemistry. The bibliographical references are sufficient to satisfy those who need further information than the text provides. The volume maintains the standard set in former editions and attains the full measure of improvement expected from revision.

THE GOLD-HEADED CANE.

DR. GEORGE C. PEACHEY'S new edition of *The Gold-Headed Cane*[8] is an attractive work both in its form and in the matter provided by his introduction, annotations, and six fine photogravure portraits of Radcliffe, Mead, Askew, William and David Pitcairn, and Matthew Baillie. This medical classic was first published anonymously, though now known to have been written by Dr. William Macmichael, Registrar of the Royal College of Physicians of London, in 1827, and passed into a second and much enlarged edition in the following year; it gave a pleasant gossipy account of the medical world in the times of the physicians mentioned above, and purported to be the memoirs of a gold-headed cane which was successively carried by those medical worthies. The third edition, in 1884, which brought the subject-matter down to the year 1858, was edited by Dr. William Munk, Harveian Librarian of the Royal College of Physicians, author of the *Roll* of the College, and therefore excellently qualified to make additions and notes. In 1915 a fourth edition, with an introduction by the late Sir William Osler and a preface by Dr. F. R. Packard of Philadelphia, the editor of *The Annals of Medical History*, was brought out by the publishing firm of P. B. Hoeber of New York, and in 1920 a stereotyped issue of this appeared in this country from the Oxford University Press; this tastefully got up volume reproduced the text and illustrations of the second (1828) edition, and, like the previous editions, was an octavo.

Dr. Peachey's edition also follows the text and contains the illustrations of the second edition, but it is in quarto; his notes are distinguished from those of the original by being in italics. His pleasantly written introduction etches in with a light hand the characteristics of the carriers of the gold-headed cane, and incidentally reveals the editor's knowledge and love of heraldry and bookplates. Among other happy touches he quotes the contemporary epigram on Francis Bacon's philosophy that "his works were like the peace of God which passeth all understanding." The additional notes show that Dr. Peachey obeys the injunction—more admired than practised, it must be feared, by many of us—of verifying references, and by this process he throws polite doubt on some of the statements made current in this favourite classic. Further point and piquancy are thus added to the excellences of this edition, on which the editor must be heartily congratulated.

[8] *The Gold-Headed Cane* (by William Macmichael, M.D.). A new edition with an Introduction and Annotations by George C. Peachey. London: Henry Kimpton. 1923. (Cr. 4to, pp. xxxii + 155; 6 full-page photogravures, 90 other illustrations. 18s. net.)

NOTES ON BOOKS.

THE fifth edition of HEWLETT'S *Pathology*[9] is characterized by the inclusion of certain sections—notably those on deficiency diseases, allergy, and blood-grouping—which did not appear in the last edition published five years ago. Short paragraphs have been added on encephalitis lethargica and herpes, containing a reference to the recent French work on the filtrable viruses encountered in these diseases, while a few lines on botulism have somewhat questionably been placed in relation to them. A helpful and illuminating page has been devoted to the reaction of the blood, with a table defining the exact meaning of such conditions as acidaemia, alkalaemia, alkalosis, and ketosis. The chapter on the ductless glands has been revised, and now furnishes a succinct and not too detailed account of the complicated series of changes dependent on alterations in the normal structure and function of these organs. It is perhaps unfortunate that the pancreas has not been included. There seems no reasonable doubt that diabetes mellitus is related to the internal secretion of this gland, and indeed it would have been well to have dealt with the whole subject of glycosuria in this chapter. Ehrlich's theory of immunity is still maintained in all its pristine magnificence; we imagine that its value for teaching purposes has been permitted to outweigh its inherent defects and misleading suggestions. The book is clear, concise, and comprehensive, and we wish it all the success that it deserves.

Marshal Catinat, in times so long ago as those of Louis XIV, asserted that "no man is a hero to his valet de chambre." But in these days when the valet is of little account, and the private secretary has assumed his more important and higher attributes, we find that a man may be a hero to his secretary. Mr. NEVILLE LANGTON has written a little book entitled *The Prince of Beggars*,[10] being some account of the beggings of Sydney Holland, Viscount Knutsford, during twenty-five years as chairman of the London Hospital. Lord Knutsford's interest in medical affairs may perhaps be traced to the fact that he is a grandson of a sometime distinguished member of our profession; he has himself played no small part in the affairs of so widely known a medical cosmos as the London Hospital. The beggar is honoured in the East and finds a place in the sun from which no one will dare to shift him; in our matter-of-fact West the beggar was a vagabond to be whipped at the cart tail, according to the direction of Tudor statutes still unrepealed. But there are beggars and beggars, and Lord Knutsford is one of the exceptional beggars whom we would not scourge but encourage. Mr. Langton's book is lightly written, and has many pretty stories within it incidental to begging. One of the best is that of an old lady who received an appeal for help for the hospital, in reply to which she wrote whole pages of religious advice, and woman-wise ended with a postscript, which ran: "P.S.—Prey without ceasing."

Dr. JOSEPH B. DE LEE of Chicago has issued the sixth edition of his *Obstetrics for Nurses*,[11] which first appeared in 1904. In process of time the book has undergone many changes, but the author states that it has not been necessary to make many alterations in preparing his new edition. The book is addressed to nurses, and appears well designed to meet their needs.

[9] *Pathology, General and Special, for Students of Medicine.* By R. Tanner Hewlett, M.D., F.R.C.P., D.P.H. Fifth edition. London: J. and A. Churchill. 1923. (Post 8vo, pp. x + 531; plates 48, figures 12. 18s. net.)

[10] *The Prince of Beggars.* By Neville Langton, Private Secretary to Lord Knutsford. London: Hutchinson and Co. 1922. (Cr. 8vo, pp. 224. 6s. net.)

[11] *Obstetrics for Nurses.* By Joseph B. De Lee, A.M., M.D. Sixth edition, entirely reset. Philadelphia and London: W. B. Saunders Company. 1922. (Post 8vo, pp. 525; 244 figures. 15s. net.)

SMALL-POX AND VACCINATION IN THE PHILIPPINES.

BY

JOHN C. McVAIL, M.D., LL.D., F.R.F.P.S.G.

I HAVE been asked by the Editor of the BRITISH MEDICAL JOURNAL to write about small-pox and vaccination in the Philippines, and, in order that I may be in a position to do so, have made myself acquainted with the Reports of the Philippine Health Service for the three years 1918, 1919, and 1920, together with various other relevant publications. A corresponding report for the year 1921 has not been obtainable—possibly it has not been issued—but some partial reports have become available.

The three annual Reports contain between them over 1,400 closely packed pages of miscellaneous material relating to health and disease in the islands, prepared under the direction of Dr. Vicente de Jesús, Director of Health. At the end of each there is a superabundantly long index, bewildering in its details, repetitions, and omissions, but the volumes are not prefixed by any table of contents to guide the reader in search of information. Some of the contributions are evidently by officers to whom English is a foreign language; they are not in the least to blame for that, but the meaning is occasionally obscure, and these matters are mentioned only lest the reviewer may anywhere have fallen into error. The reports have received attention in America and this country owing to their remarkable statistics of small-pox and vaccination. In reply to a question in Parliament Sir Alfred Mond, then Minister of Health, gave the following figures[1] of small-pox cases and deaths in the Philippines:

Year.	Cases.	Deaths.
1915	6,265	216
1916	2,520	554
1917	542	255
1918	47,369	16,447
1919	65,180	44,408
1920	10,448	4,386
1921	1,823	790

Population.—By summation from different parts of the reports of figures which are not given in any one place, the population of the islands appears to be as follows:

(1) 1919 Report, p. 104, Provinces	8,954,448
(2) 1920 Report, p. 367, Manila	289,463
(3) 1920 Report, pp. 457–8, Mindanao and Sulu	542,907
	9,786,818

Luzon, the principal and most northerly island, contains the capital, Manila. Mindanao and Sulu are southern islands. There are thirty-six provinces in the northern islands and nine in the southern, but I take it, though the point is not clear, that the population under (1) above does not include that of the nine southern provinces, which I have added under (3). The Governor-General of the Philippines, Major-General Leonard Wood, M.D., in May, 1922, estimated the population at approximately 11,000,000.[2] The whole group of islands is situated south of China, east of Siam, and north of Australia. The temperature ranges from 90° to 100°.

After the war with Spain in 1898 the United States came into occupation of the Philippines, and in July, 1901, the military government was formally succeeded by the civil.[3] At the end of 1918 the Filipinos themselves took over entire charge, but transfer of control appears to have been in progress for some time previously.

It will be convenient to discuss the subject in respect first of small-pox and next of vaccination.

I. SMALL-POX.

Small-pox is endemic in the Philippines. It is stated, on responsible authority,[4] "that during the Spanish régime and for some years after the American occupation more than 40,000 deaths from small-pox occurred annually in the Philippines."

In the Report for 1920 (diagram opposite page 216) the following small-pox statistics appear:

Small-pox.

Year.	Deaths.	Year.	Deaths.
1902	14,795	1912	561
1903	18,919	1913	858
1904	9,308	1914	322
1905	5,055	1915	257
1906	4,044	1916	239
1907	2,604	1917	785
1908	7,810	1918	14,574
1909	5,363	1919	45,873
1910	3,106	1920	4,386
1911	1,106		

It will be seen that the figures for the years 1915–20 have a general resemblance to those given by Sir Alfred Mond, but are not identical with them. While the disease is obviously endemic, the figures suggest that for a number of years prior to the epidemic of 1918–20 many provinces or islands may have had no small-pox, and in no year save 1919 is any approach made to the mortality of 40,000 said to have occurred under Spanish rule.

Fatality.

Following Sir Alfred Mond's figures, the percentage fatality in each of the seven years 1915–21 was 3, 22, 47, 34, 68, 42, and 43. With the exception of the first two, these rates are remarkably high, especially as they include both vaccinated and unvaccinated. But before accepting them certain points must be considered.

Varioloid in the Reports is often classed separately from variola, and shows a much lower fatality rate. In Manila (Report, 1918, p. 283) there were 1,326 cases of small-pox, with 66 per cent. of deaths, but besides there were 521 cases of varioloid with 11 deaths, or 2 per cent. In the same city in 1919 (p. 79), of 57 small-pox cases, 37 were fatal, but of 29 varioloid cases only one died. San Lazaro Hospital for infectious diseases has separate departments for small-pox and varioloid, as well as for varicella. In 1918 (p. 54) the hospital had 1,079 cases of small-pox with 528 deaths, whilst in 560 cases of varioloid there were only 11 deaths, and in 1919 (p. 37), though the numbers were quite small, the same kind of difference is recorded. These proportions are not maintained everywhere. In the southern islands in 1919 (p. 356) there were only 102 varioloid cases with 7 deaths, against 5,840 cases of small-pox with 1,466 deaths. It would appear, therefore, that here practically all variolous cases were entered as small-pox, and it is very notable that the fatality rate of 25 per cent. is much lower than the rates above given for Manila and San Lazaro Hospital.

Apart from statistics references to varioloid are few. Dr. Eugenio Hernando, chief of the Division of the Provinces, says (1918, p. 116):

> "Both virulent and mild small-pox types of the disease have been present during the epidemic. All cases of haemorrhagic type were fatal. Mild cases occurred amongst those unvaccinated, and sometimes amongst those with vaccination scars, but in the latter the form was generally discrete small-pox or mild varioloid."

This is in accord with President Taft's reference, in an address to the Medical Club of Philadelphia in 1911, to the Philippines having been afflicted with "small-pox of all kinds . . . in which the black small-pox of the most virulent type flourished before our coming."[5] Of the southern islands in 1919 Dr. Jacobo Fajardo, Chief of Division, says (p. 355) that the varioloid fatality rate was 6.96 per cent. (102 cases with 7 deaths), and that:

> "The majority of the cases were persons who had been vaccinated, but with negative results, although there were some cases with positive vaccination."

Apart from these observations, there is no explanation of how the word "varioloid" is applied, whether in the old sense of variola modified by vaccination; or to a mild type of small-pox breeding true, but running concurrently with the haemorrhagic sort; or whether the name was given to the milder cases of a common epidemic. But the existence of varioloid was looked on as a reason for pressing the practice of vaccination, and its separate classification seriously affects the value of the fatality rates.

Domestic Treatment of Small-pox.

Another question bearing on the fatality rates is the kind of service, medical and nursing, available in the Philippines. In 1919 (p. 192), in the Provinces 288 emergency hospitals

[1] BRITISH MEDICAL JOURNAL, April 8th, 1922, p. 579.
[2] U.S. Public Health Service Weekly Report, September 22nd, 1922.
[3] *Philippine Journal of Science*, vol. iii, September, 1908, p. 270.
[4] Victor G. Heiser, M.D., Consultant in Health to the Governor-General of the Philippine Islands, and Charles M. Leach, M.D., Manila (*Journal of the American Health Association*, July 1st, 1922, p. 40).
[5] *The Fight against Disease.* April, 1922. Research Defence Society. Macmillan and Co.

including about 100 isolation houses, were established, and among 16,743 cases of small-pox received into them there were 4,706 deaths, or 28 per cent., as against 54 per cent. in cases treated at home. In 1920 (p. 226) 21 emergency hospitals were established in the Provinces, and the fatality rate in them was only 16.8 per cent., against 43.5 per cent. outside. There appear to be about 1,200 physicians and surgeons in the islands and 1,100 trained nurses,[6] or one doctor and one nurse to about 8,000 of population. In the public service (1919, p. 104) there is a doctor for every 34,440 inhabitants, and a nurse for every 69,414, "considering that midwives and dispensary attendants may perform the work proper of the nurses."

The people themselves who have this meagre public and private medical and nursing service were described by Dr. Heiser when Director of Health[7] as "a weak and feeble race," superstitious, content in ignorance and poverty, with habits "the antithesis of the simplest health doctrines and practices." Some fifty dialects are spoken by peasants who understand neither English nor Spanish. With such a population unskilled in mothercraft and in nursing and dieting of the sick, and very poorly provided with doctors and nurses, it is not surprising that the small-pox fatality rate of cases left at home was double that of the hospitals.

Notification.

A third question bearing on the fatality rate is the completeness or incompleteness of notification of the disease. Fatal cases would almost necessarily be known in connexion with death and burial, but mild cases might not be reported. "Many babies suffering from small-pox were concealed, and not discovered till the disease was well advanced" (1918 Report, p. 123, Provinces). Little reference, however, is made to the matter. The word "notification" does not occur in the index of any of the volumes. Any extensive evasion of intimation would misrepresent the facts in two respects—by understating prevalence and overstating fatality.

While the above considerations as to varioloid, domestic treatment, and notification compel the view that for purposes of comparison the fatality rates are far too high, they do not suggest what should be substituted for them; they, however, leave no doubt that small-pox in the Philippines has been a very fatal disease.

Epidemic Virulence.

It is of epidemiological interest to observe the increasing virulence of the disease from the beginnings of the recent epidemic until its culmination in 1919. Attention has already been called to the successive annual rates from 1915 to 1920, but that is not all. In the Report for 1918 (p. 7) the Director of Health notes that, although small-pox was reported in 1916 and 1917 from certain provinces, the other provinces and the city of Manila still enjoyed immunity.

"For the last two years, however," he says, "a notable increase in cases of varioloid had been noted, and this Service had pointed out that the immunity conferred to the population by the previous general vaccination had begun to wane."

Dr. Rosario, in reporting on Manila (1919, p. 78) makes a similar observation regarding variola. The small-pox epidemic began there in December, 1917, and was the first after nine years.

The fatality rate had "been observed to be increasing from 20 per cent. in the former years, 16.13 in 1905–6, 25 to 50 per cent. in 1907-8 in the whole Philippine Islands, and 65.51 during the present epidemic."

II. VACCINATION.

An immense amount of vaccination has been reported in the Philippines since the islands came under the control of the United States.

There are references to general vaccinations in 1905–6 (1918 Report, p. 7) and in 1909–10 (1919 Report, p. 194). In a report belonging to the third quarter of 1907, issued by the Bureau of Health, Dr. Heiser states that more than two million persons had been vaccinated, and "in about another year it is hoped that the first complete primary vaccination ever attempted will be completed." In 1919 (p. 197) it is said that "more than ten million persons had been vaccinated, which constitutes more than the population corresponding to this division" (the Provinces). In 1920 (p. 260), owing to revaccination having been begun, the total number of persons vaccinated in the Provinces in the three years 1918–20 is stated at 13,699,974.

These vaccinations were in the course of, not before, the epidemic, but from 1914 to 1917 in the quarterly reports very many thousands of vaccinations, even hundreds of thousands in some quarters, were alleged to have been performed. The word "alleged" is used advisedly.

I proceed now to make some observations on vaccination in the Philippines as revealed in the Reports and otherwise.

The Attitude of the Filipinos.

Dr. D. A. Jugueta, chief of one of the vaccinating parties to be referred to later, writes (1919 Report, p. 217):

"Lack of co-operation on the part of a great many people as the result of ignorance and superstition constitutes the most serious drawback in the general vaccination." In the Provinces "a great many of these people show antagonistic spirit towards the work, and not only avoid vaccination when they can but often try to hinder the work of the party." Further, "a great many of them prevent the successful taking of the vaccine."

The last point will be mentioned again in relation to the island of Cebu.

Inefficiency of Vaccination Service.

The Reports contain much evidence and many complaints of the inefficiency of the service, and the incompetence, carelessness, and untrustworthiness of the local officers. Whoever was responsible for central supervision, whether United States or Filipino officers, it is important to bear in mind that for local service only the latter were available. Dr. Eugenio Hernando, chief of the division of the Provinces, in describing the organization of his department at the beginning of his report for 1919 attributes low efficiency to two main causes:

1. The small number of employees compared with the population.
2. "Because many of the sanitary inspectors are practically inefficient to discharge the duties as such; however, they are retained in the service for lack of better ones." About 90 per cent. of them were not classified in the Civil Service, and the standard of salaries did not attract better men. In 1920 (p. 19) Dr. Vicente de Jesús writes that "the lack of properly trained personnel is being keenly felt, especially outside of the large centres of population"; in these outside areas even a relatively bigger salary was not sufficiently attractive. Dr. Jacobo Fajardo, chief of the southern division, writes in 1920 (p. 312) concerning Mi-amis of "the lack of instructions by the district health officer of said province to the sanitary inspectors and vaccinators, and the lack of supervision by him of their work."

Dr. J. D. Long (who succeeded Dr. Heiser as Director of Health) doubted, in February, 1918 (p. 193 of 1919 Report), whether annual systematic vaccination had been carried out, or that in certain localities the inhabitants had remained unvaccinated. In a circular to all district health officers in April he says that "it appears that some district health officers do not take the proper interest in a sanitary measure so necessary to protect the community," and he threatens severe punishment for negligence. A few months later (p. 195) he writes that, especially in the case of recalcitrant well-to-do persons, the necessary efforts are not made to carry out the provisions for vaccination.

Complaints of inefficient service are not confined to the prevention of small-pox. Concerning an epidemic of dysentery (1919 Report, p. 192) it is recorded that:

"The attention given by some of the health officers was so very little that" an admonitory circular was issued in July, 1919, stating "that district health officers and presidents of sanitary divisions are not paying due attention for the control of the said disease."

Falsification of Returns.

In the Report for 1919 on the Provinces (p. 204) it is complained by Dr. Hernando that:

"Sometimes reports are received stating that systematic vaccination has been completed in a certain municipality, and this appears to be true upon consulting the reports of vaccinators, but on several occasions a personal inspection in the municipality concerned disclosed the fact that 20 to 30 per cent. of the children were never vaccinated."

The volume for 1920 (p. 312) gives an illustration of this in the southern islands.

"In the reports of the district health officer it appears that 250,000 vaccinations were made, but subsequent investigations revealed that only 131,700 were performed."

This goes far to support the view vigorously expressed by Major-General Leonard Wood, Governor-General of the Philippines, in April, 1922.[8]

"The records show that vaccination has been steadily continued since 1913, but on investigation it was found that owing to the inefficient inspection vaccination consisted mostly in destroying the vaccine and submitting reports to the main office that it had been applied."

[6] Public Health Reports issued by the U.S. Public Health Service, Washington, vol. 37, No. 38, September 22nd, 1922.
[7] *Philippine Journal of Science*, vol. v, 1910, p. 174.
[8] U.S. Public Health Service Weekly Reports, September 22nd, 1922.

Inspection of Vaccinations.

Not nearly all alleged vaccinations were officially inspected. Of 414,410 in 1918 (p. 62) only 154,664 were seen again as to the result, though this was in Manila, where surveillance might have been assumed. In the Provinces in the same year, if the returns are to be believed, of 4,318,830 vaccinations 3,285,376 were inspected. In the southern islands the respective figures were 176,659 and 108,055. In April, 1918 (p. 194 of 1919 Report), Dr. Long pointed out that only 48 per cent. of vaccinations had been inspected. In 1919 in Manila there were recorded 360,712 vaccinations and 133,331 inspections, the corresponding figures for the Provinces (p. 476) being 7,277,481, and 4,867,646. The figures for 1920 (pp. 260 and 320) are similar, but those for Manila are notable—257,951 vaccinations and only 83,007 inspections.

These figures are quoted, not in criticism of the administration, for whom complete inspection may have been an impossible task, but only to emphasize the fact that as to millions of persons returned as vaccinated it is not professed that anything whatever is known as to success or failure.

Negative Vaccinations.

Where vaccinations actually were inspected the percentages of failures were extraordinarily high.

In the Provinces (1920 Report) in two and a half years from the middle of 1918, about 4,300,000 vaccine units "had been distributed" with an "estimated positive result of 77 per cent." In the year 1920 itself the total vaccinations (included in the two and a half years) were 3,222,460, of which 1,399,985 were successful, or 43.58 per cent. In the southern islands (1919 Report, p. 357) the positive results were 57.22 in 1918 and 64.93 in 1919, but sometimes they were only 10 to 15 per cent. (1920 Report, p. 24). In the Provinces the failure rate that year ranged from 21 to 78 per cent. in different provinces. In 1919 the figures were generally similar. In April, 1918, Dr. Long complained (p. 194 of 1919 Report) that the percentage of positive results was much less in the Provinces than in Manila. In 1919 (p. 476) and up to February, 1920, the total vaccinations for Manila and the Provinces were reported as 7,638,193, the inspections 5,000,977, the positives 3,310,982, and the negatives 1,690,045, or 33 per cent. In the following year, for the same areas (p. 418), the returns gave vaccinations 3,523,749, inspections 2,318,861, positives 1,468,944, and negatives 849,917, or over 36 per cent.

These figures, however, include all ages, and revaccinations as well as primary vaccinations, so it has to be considered whether much or all of the failure was not due to insusceptibility through previous vaccination. That explanation is advanced regarding Manila, where, of 154,644 vaccinations in 1918, no fewer than 85,085, or 55 per cent., were negative. Unfortunately its validity is very limited, as proved by the statistics of negative results in children under 1 year, where protection by previous vaccination would be negligible. In the capital, where, if anywhere, it might be expected that competent vaccinators would be available and lymph deterioration avoidable, there were 23,058 vaccinations of babies under 1 year in 1920. The results were inspected in 16,045 of these, and in the total inspected there were 26.6 per cent. of failures. The details are as follow:

Age.	Inspected.	Positive.	Per cent. Positive.
1–2 months... ...	9,768	7,461	76.38
2–3 ,, ...	3,614	2,468	68.28
3–6 ,, ...	2,335	1,621	69.42
6–12 ,, ...	328	242	73.78

There is still, however, another possible explanation of failures under 1 year of age. Dr. Dalmacio A. Jugueta (1919 Report, p. 217), who had charge of a vaccinating party (to be referred to later) in the island of Cebu, gives the following percentage of positive results at different ages:

	Per cent.
From 0 to 1 month	... 59
,, 1 month to 1 year	... 64
,, 1 year to 5 years	... 66
,, 5 to 10 years	... 59
,, 10 to 20 years	... 56
Over 20 years	... 61

The failure rates therefore ranged from 34 to 44 per cent. Among infants they were 41 per cent. under 1 month and 36 per cent. between 1 month and 1 year. About infants Dr. Jugueta says:

"There are only a few mothers who are convinced and are willing to submit their babies to the vaccination, and since they only have them vaccinated to evade the law a great many of them prevent the successful taking of the vaccine, and thus the low rate of percentage of positives."

This is a relevant consideration, and may account in whole or in part for the percentage of failures being considerably higher in Cebu than in Manila. But it is to be noted (1919 Report, p. 209) that only after three failures is a result to be recorded as negative.

For Manila of every 100 ultimately positive, 73 were so at the first attempt, 17 at the second, 6 at the third, and 4 after a fourth or further vaccination. On the whole the large proportion of ultimate failures in both Manila and the Provinces seems to point pretty definitely to inert lymph or incompetent vaccination. In the 1919 Report (p. 207) it is stated that "the percentage of positives among the groups by ages from 0 to 10 years cannot be given exactly, but it is estimated by several district health officers to be 80 per cent. of those who had never been vaccinated," as against a 60 per cent. average of positives. The 20 per cent. failure in the case of unvaccinated children once more suggests inert vaccine.

The Vaccine used in the Philippines.

Drs. Ashburn, Vidder, and Gentry state,[7] on the authority of Dr. Ruediger, in charge of the serum laboratory, Bureau of Science, Manila, which is responsible for the supply of vaccine, that the strain of vaccine virus used at that time (1913) "was derived from a fatal case of human small-pox in 1908, having been passed first through monkeys, and from the second monkey to a heifer, and from the fifth heifer to man." Whether this lymph is still in use, or whether any fresh sources have been introduced, does not appear from the reports I have consulted. Vaccine, whatever its origin, is very likely to deteriorate in the Philippines. The temperature commonly ranges between 90° and 100° F. To many parts of the islands the distances are great, the roads and means of conveyance bad, equipment for preservation of lymph by storage in ice defective or wanting (1919 Report, p. 357), and the staff ignorant, indifferent, and inefficient.

Concerning its use in practice, I again resort to quotation:

Dr. Jacobo Fajardo, chief of the division of Mindanao and Sulu (the southern islands), says in the Report for 1918 (p. 211) that one of his difficulties was the "insufficiency and unsatisfactory kind of vaccine virus," and that as regards the Mohammedan population "after preaching the efficacy of vaccination against small-pox they allowed themselves to be vaccinated. With the virus supplied the vaccination did not prevent or attenuate the small-pox epidemic." Concerning an outbreak in Lanao, where there were 2,700 cases, he writes: "It would not have spread throughout the province were it not for the inactivity, or at least the weakness, of the vaccine virus."

Dr. Vicente de Jesús, who followed Dr. John D. Long as Director of Health, speaks in the 1920 Report of cases occurring "in the most remote barrios where vaccine virus could not arrive in good condition, but by the use of powdered dry vaccine in such places" the number of cases of small-pox was much reduced. In the same Report (1920) Dr. Fajardo is no less emphatic than in 1918. Concerning Misamis he writes: "The lack of instructions by the district health officer of said province to the sanitary inspectors and vaccinators, and the lack of supervision by him of their work, account in great measure for the unchecked spread of the disease."

It was here that the vaccine gave only 10 to 15 per cent. of positive results, notwithstanding resort to thermos bottles, banana leaves, etc., in substitution for ice. Dried vaccine, however, gave good results, but unfortunately the Bureau of Science "at best could fill only about 25 per cent. of the requisitions."

Suspicion arises as to the value of the vaccine used, even in the capital city of Manila.

Dr. Heiser (who, after ceasing to be Director became Consultant in Health to the Governor-General of the Philippines) and Dr. Charles M. Leach of Manila have stated recently[8] that the successfully vaccinated in Manila were immensely better off than the others, in respect both of attacks and deaths, and there need be no doubt that even poor lymph was of great value compared with no vaccination at all. But the figures which challenge attention are those relating to attacks and deaths amongst vaccinated infants and children. Under 1 year of age there were ten attacks and four deaths; between 1 and 2 years twenty-one attacks and fourteen deaths; between 2 and 3 years ten attacks and three deaths; between 3 and 4 years eighteen attacks and eight deaths; and between 4 and 5 years twenty-one attacks and nine deaths. These figures in respect both of attacks and deaths are frankly impossible in the case of anything that in this country would be considered to have the remotest claim to be called successful vaccination.

Duration of Vaccinal Protection.

In a circular of instructions to district health officers issued on February 25th, 1918 (p. 193 of 1919 Report), Dr. John D. Long requested that, excluding children under 2 years of age who had at any time been vaccinated with

[7] *Philippine Journal of Science* for 1913 (p. 20).
[8] *Journ. Amer. Med. Assoc.*, July 1st, 1922.

positive results, "all other persons should be revaccinated even though they have been vaccinated in former years with positive results, except those successfully vaccinated during 1917." Looking to the date of the circular, this instruction means in effect that the authorities could not rely on much more than a single year's protection from a vaccination as performed in the Philippines. On the same point reference may be made to an article[9] by Dr. Heiser in 1910, which shows that the difficulty about the shortness of immunity was no after-thought to account for the epidemic of 1918–20. At a time when the annual deaths from small-pox had fallen from 40,000 before and in the early days of the American occupation, and from the 14,000 of 1902 and the 19,000 of 1903 to 3,000 in 1910, Dr. Heiser, then Director of Health, said he had found that ordinary cow-pox was not as effective among dark as among white-skinned races. Among 100 vaccinated whites no case had occurred within five years after vaccination, whilst among Filipinos, "of whose successful vaccination within one preceding year there could be little doubt," many cases had occurred. Experience at Bilibid Prison supported this view. He was also careful to point out the position as regards lymph supply, especially for remote regions. Lymph would not keep for more than seven to ten days, whilst powdered vaccine and dry points had been tried with only (at that time) a small measure of success.

As regards the shortness of immunity conferred on natives by vaccination, one statement to the contrary requires to be mentioned. In the 1919 Report (p. 206) Dr. de Jesús writes:

"Many mothers who have been confined in small-pox hospitals with their children sick of small-pox were only once vaccinated, but vaccinated well, and not one of them developed infection of small-pox in spite of the great exposure to which they had been exposed."

Such immunity is often experienced in this country, but admission to hospital of a mother in such circumstances would depend on the recency of her vaccination or on her submitting to revaccination. Only if different vaccines of different value were in use, or if types of small-pox were totally different, can these statements of Dr. Heiser and Dr. de Jesús be reconciled.

In the 1919 Report (p. 193) it is stated, regarding the epidemic up to that time, that of 56,018 reported cases, 52,763, or 94 per cent., had never been vaccinated.

Dried Vaccine.

The prospects as regards remote regions are now better. The 1919 Report of the Health Service (p. 205) quotes an important report by the director of the Bureau regarding the preparation of dried and pulverized vaccine in the later part of 1919. Experiments were not finished by December 1st (the date of the report), but good results were being obtained.

"The vaccine showed first-class takes after being prepared and kept without ice for two months at room temperature." A parcel prepared on September 20th was shipped on November 1st by a boat which returned to Manila on November 24th. On the following day the lymph was tested on monkeys and showed first-class "takes" after having made a forty-day trip round practically the entire archipelago.

A New Vaccination Scheme.

While struggling with all their difficulties and disappointments, the Health Service is redoubling its efforts to rid the islands of small-pox. In 1919 (pp. 207–218) a new organization was established for "systematic and extensive vaccination throughout the islands and to obtain complete immunization of all the inhabitants for the next eight years." The scheme is twofold: first, "vaccination of all newborn and contacts of small-pox cases," and secondly, "intensive and extensive vaccination of all the inhabitants never vaccinated, or vaccinated with negative results, or vaccinated eight years ago." For the former purpose the regular and temporary sanitary personnel assigned to the provinces is relied on. For the second, six special vaccinating parties were organized to work independently of the regular staff. Each of the six parties consists of twenty vaccinators, with a doctor as chief. Three of the parties were allocated to Luzon and three to more southern provinces or islands. The vaccinators were given full written instructions, which, as the Report shows, were carefully prepared. But whether owing to inert vaccine or to habitual wiping away of lymph immediately after its insertion, as already described by Dr. Jugueta, or to insusceptibility due to previous vaccination, or to these causes combined, the efforts of the vaccinating parties, as measured by case success, were far from reassuring. (It may be interpolated here that in this country Government lymph in the hands of public vaccinators has a case success of 99 per cent. and an insertion success of 96 per cent.)

A tabulation of the work done shows that in 1919, in 75 municipalities, with a total population of 800,495, there were performed 398,753 vaccinations, of which 145,551, or rather less than half, gave a positive result. In 1920 more than double the amount of work was overtaken. In 116 municipalities, with a population of 1,161,391, there were 950,885 vaccinations, with 345,366, or 36 per cent., of positive results.

The instruction is that no case shall be reported as negative excepting after three failures. No locality is to be considered "completely and positively vaccinated unless the total positives equal at least 75 per cent. of the total population."

But the statistics show that not one of the six parties succeeded, either in 1919 or 1920, in achieving anything like 75 per cent. of successes. Insusceptibility to vaccination owing to previous small-pox was only to be recognized as a reason for not vaccinating if the attack had occurred "during the preceding year"; that should account for some proportion of the failures.

It surely cannot be doubted that the members of the six vaccinating parties have, after all the past experiences in the Philippines, been sufficiently instructed in their work, and that its performance is being medically supervised. The regulations issued for vaccinators show that lymph conveyance and preservation are now receiving much attention. Portable ice boxes, we are told, are to be regularly used, and vaccinators are warned against exposure of the vaccine to the sun, or keeping it in the pocket of the operator. Dried lymph is being provided for remote districts. Even, however, if 100 per cent. of positive results were obtained from dried lymph, a question behind it all would be the efficacy of the lymph used in the Philippines against the strain of variola locally endemic.

Manila in 1918.

But to whatever degree the efficacy of the vaccine in use falls short, it is right to call attention to evidence by Drs. Heiser and Leach that where it gets a fair chance it is of real value in diminishing the risk both of attack and death. Drs. Heiser and Leach, in the paper already referred to, give various particulars regarding the prevalence of small-pox in Manila, where the disease could be kept under skilled observation. Of 1,326 cases in 1918, only 177 occurred among the successfully vaccinated, and of 989 deaths only 60, or 7 per cent., were in that class. In the city not a death had occurred from small-pox in the seven years prior to 1914, and in the population of the Philippines generally, instead of 40,000 deaths a year, there were only a few hundreds. But, they say:

"After 1914 general vaccination of newborn children and other unprotected persons was not effectively carried out," and "much of the vaccine was never applied or not until it had deteriorated. Minor health officials and vaccinators found it much easier simply to report vaccinations than actually to carry out the procedure. Quantities of vaccine virus were actually discovered in waste-paper baskets. . . .

"Thus a huge unvaccinated population came into being, and it was only necessary for the ever-present spark to fall among them to start the conflagration."

When small-pox did come to Manila in 1918, no less than 67 per cent. of the cases and 75 per cent. of the deaths occurred in children under 4 years of age—that is, born since the practice of vaccination had been neglected, as explained by Drs. Heiser and Leach. But even so the attacks and deaths which they record amongst vaccinated babies are occurrences which ought to be unknown.

SUMMARY.

The available data appear to warrant the following provisional conclusions:

1. Small-pox in the Philippines is very severe in type, but its natural fatality rates are very considerably overstated by the exclusion of varioloid, the want of skilled treatment and nursing in the homes of the people, and, probably, incomplete notification of cases.

2. The published statistics of vaccination in the Philippines are quite unreliable owing to (*a*) domestic resistance to the operation, (*b*) inefficiency of the service, (*c*) falsification of returns, (*d*) insufficiency of inspection, and (*e*) the high percentage of negative results in inspected cases, even in infants.

3. The vaccine which has been used in the Philippines is subject to deterioration owing to climatic conditions, defective

[9] Unsolved Problems Peculiar to the Philippines, *Philippine Journal of Science*, vol. v, 1910, p. 174.

preservation and transit, and want of care by local officers. At least part of it appears to be inefficient or inert.

Much in this article has been said by way of raising questions rather than of stating conclusions, and much remains obscure which ought to be made clear as respects both small-pox and vaccination. From the point of view of epidemiology it is desirable to know what more may be ascertainable of the history of small-pox in the Philippines—its prevalence, its varieties, from black pox to varioloid, its fatality in the days of the Spanish possession and when the United States came into control. But the United States Public Health Service appears to be no longer responsible, the Filipino local government having taken over the administrative control. The whole subject calls for inquiry—not merely by study of the Reports, as in this article, but by competent visitation of the islands and skilled investigation of every essential detail. One body, the Rockefeller Foundation, seems in every respect qualified for the duty. It recently carried out through a specialist an examination of the health problems of Mauritius, a British possession much smaller and less important than the Philippines. The Rockefeller Foundation had already, in May last, entered on a medical survey of the Philippines, and though the Governor-General in mentioning this gives no details, yet it may be assumed that small-pox and vaccination must come under review.

ANTHRAX CONTROL.

International Advisory Committee.

We have received from the headquarters in Geneva of the International Labour Office, League of Nations, an account of the first session of the International Anthrax Committee held in London from December 5th to 14th, 1922.

The Committee was set up by the Third International Labour Conference with a view to studying thoroughly the problem of industrial anthrax, and more especially that of disinfection in the wool industry.

The Committee, which was to include experts appointed by the various importing and exporting countries, was composed as follows:

Australia, Sir Thomas Oliver; Belgium, Dr. Glibert; France, M. Boulin; Germany, Dr. Frey; Great Britain, Sir Wm. Middlebrook, Chairman of the Departmental Committee on Anthrax; Italy, Dr. Loriga; India, Colonel Hutchinson; Japan, Dr. Konai; South Africa, Dr. Dixon; Spain, Professor Rocca; Sweden, Mr. Ribbing; Observer for the United States, Dr. Dorset.

The Committee was charged with the duty of inquiring into:

1. The problem, in all its bearings, of the disinfection of wool and hair suspected of being infected by anthrax.
2. The most practical and effective methods of preventing infection among flocks.
3. To submit a report to the Governing Body in sufficient time to allow the latter to decide upon the necessity of including the question in the agenda of the Fifth International Labour Conference.
4. The possibilities of dealing with infection by anthrax from hides, skins, and other suspected animal products.

The preliminary work of the Advisory Committee was summarized in a documentary report of the Industrial Hygiene Section of the International Labour Office containing information from twenty-seven countries as to statistics and legislation regarding the danger of anthrax among human beings and animals. The report also contained an analytical chapter on disinfecting methods proposed and measures contemplated to combat the diseases among animals. Moreover, the Chairman of the Committee, Sir Wm. Middlebrook, distributed a pamphlet containing a brief survey on the development of the question and the results obtained in England during the last few years.

After full discussion the following resolutions were carried:

1. That hair used in the brush-making and upholstering industries shall be disinfected before the materials are handled industrially.
2. That wool and hair to be used in the textile industry shall be disinfected before the materials are handled industrially, except in the following cases:
   (*a*) If the country of origin is included in the schedule of countries where the danger is slight.
   (*b*) If the material to be imported has already been disinfected by a process recognized as effective.
   (*c*) If wools and long hair have to be sorted before washing, unless these products are not included in the list of harmless products.
   (*d*) In such other cases as may be determined by the Committee.

The experts who had come to give evidence at the request of certain members of the Committee agreed that the proportion of wool imported into England which does not require sorting before washing is extremely small, and that it is almost always this kind of goods which gives rise to the danger of anthrax amongst the workers; that if it is technically possible to sort the wools after washing, it would be bad from the commercial point of view. The list of countries where the danger is slight will be brought up to date each year by the Advisory Committee on Industrial Hygiene of the International Labour Office. In the same way the industrial processes of disinfection will have to be approved by the Governing Body of the International Labour Office in accordance with the opinion of the Advisory Committee on Industrial Hygiene, and eventually approved by the Health Committee of the League of Nations.

The Committee was of opinion that the best precautions against the danger of anthrax among flocks are at the present time the following:

1. Compulsory notification and official verification of cases of anthrax.
2. Inoculation of animals suffering from or suspected of suffering from anthrax.
3. Destruction of the entire carcass of any animals dead of or suspected to have died from anthrax, and disinfection of the immediate surroundings of the place where the animal has died, as well as of the premises where it has been kept.
4. Preventive inoculation of animals against anthrax.

In regard to industrial anthrax generally the Committee adopted the following resolution:

> The Committee is of opinion that in most countries the principal danger of industrial anthrax arises in the manipulation of hides and skins, and recognizes the impossibility of securing at the present time complete disinfection to protect against this danger. The Committee therefore recommends that regulations be laid down in the different countries having for their object the protection of the workers and the soil against infection by anthrax from hides and skins.
>
> The Committee further suggests that the International Labour Office, in conjunction with the Health Committee of the League of Nations, should organize international research and invite nations and organizations chiefly interested to undertake such research in their respective countries. The Committee considers that in view of the fact that all countries using infected materials will benefit by the discovery of a satisfactory process of disinfection it is desirable that the governing body should take into consideration the possibility of finding grants in aid of research undertaken for that purpose.

The report concludes with some observations regarding the disinfection of horns, hoofs, and bones.

ROYAL MEDICAL BENEVOLENT FUND.

At the meeting of the Committee held on January 9th 17 cases were considered and £250 voted to 13 applicants. The following is a summary of some of the cases relieved:

M.D.Brux., L.S.A., aged 62, married. Owing to chronic neurasthenia, bronchitis, and general weakness is unable to concentrate on work. Voted £26 in twelve instalments towards board and lodging.

M.D.Dublin, aged 61, married. Owing to severe nephritis with general arterio-sclerosis, has been unable to attend properly to his practice, and is now reduced to a small panel bringing in 5s. a week and private practice about the same amount. Voted £26 in twelve instalments.

Widow, aged 50, of M.D.Edin. who died in 1906. Applicant used to take post as companion-help, but owing to ill health has had to give this up. The Guild has been helping to the extent of 5s. a week, and the Fund has now voted £12. Relieved five times, total £45.

Widow, aged 41, of M.R.C.S.Eng. who died in 1914. Owing to ill health applicant is dependent upon her mother, with whom she lives. Has been relieved by the Fund eight times to the extent of £108. Voted £18 in twelve instalments.

Daughter, aged 63, of F.R.C.S. who died in 1885. Through ill health has had to give up her profession as nurse. Only income £48 per annum, out of which she has to pay £26 for rent. Relieved twice before by the Fund, total £29; voted £18 in twelve instalments.

Subscriptions may be sent to the Honorary Treasurer, Sir Charters Symonds, K.B.E., C.B., M.S., F.R.C.S., at 11, Chandos Street, Cavendish Square, London, W.1.

The Royal Medical Benevolent Fund Guild is overwhelmed in these days of exorbitant prices for clothing and household necessities with applications for coats and skirts for ladies and girls holding secretarial posts, and suits for working boys. The Guild appeals for second-hand clothes and household articles for the benefit of the widows and children who in happier times would not have needed assistance. The gifts should be sent to the Secretary of the Guild, 43, Bolsover Street, W.1.

A SPECIAL number of the *Zeitschrift für Hygiene und Infektionskrankheiten* has been dedicated to the bacteriologist Flügge, on the occasion of his 75th birthday, and a Flügge fund has been raised for the scientific investigation of tuberculosis.

British Medical Journal.

SATURDAY, JANUARY 27TH, 1923.

EDWARD JENNER.

It is a hundred years since the remains of Edward Jenner were laid to rest in a vault in the chancel of Berkeley Church. He died on January 26th, 1823, and was buried on February 3rd. He had been born in 1749 in the vicarage of Berkeley, and spent a large part of his professional life in his native village as a general practitioner—one of the most illustrious who has ever adorned the ranks of medicine. His great teacher and friend, John Hunter, wanted him to enter on a different career; but Jenner was a born naturalist, fond of a country life, so that even when, in the interests of vaccination, he was persuaded to take a house in London, he quickly repented, and later on returned to Berkeley.

The oft-told story of his great conception of preventing small-pox by means of cow-pox is classical in its simplicity and brevity. In his master's surgery at Sodbury he heard a countrywoman remark that she could not take small-pox because she had already had cow-pox. The little incident remained in the mind of the busy village doctor for many years, to be mused over, discussed with friends lay and medical, set aside and returned to with a curious mixture of perseverance and dilatoriness which was no doubt in his mind when he remarked in his *Inquiry* that people may not be aware "how often men engaged in professional pursuits are liable to interruptions which disappoint them almost at the instant of their being accomplished." Ultimately, however, in 1796, he put the matter to the touch—he inoculated with cow-pox, tested the effect by inoculation with small-pox, and found that immunity had been achieved. The rest of his life was devoted mainly to the promotion of vaccination.

Until after the end of the seventeenth century an attack of the disease itself was the only means of acquiring protection against small-pox. The price paid for this protection of survivors consisted in the death of those who did not survive, and disfigurement, blindness, and ill health amongst those who were not slain by the pestilence. But during the last three quarters of the eighteenth century the cost was lower to such as resorted to small-pox inoculation, though it is doubtful whether on balance inoculation did not do about as much harm by spreading the infection as it did good by protecting those who were inoculated. Then, at the end of that century, Jenner introduced vaccination, which protected the individual and was accompanied by no risk of conveying small-pox to others. Thus salvation was offered from the most terrible scourge which at that time afflicted humanity, and Jenner was directly responsible for saving more lives and averting more misery than it had fallen to the lot of any single human being to accomplish from the dawn of history to his day.

Jenner published his *Inquiry* in 1798, issued *Further Observations* in 1799, and *A Continuation of Facts and Observations* in 1800, besides various short papers in the *Medical and Physical Journal*; he wrote also an infinity of letters to correspondents. Briefly he held that the teats and udders of cows were subject to various eruptions, of which only one was the true cow-pox; that it was derived from an eruptive disease of the horse; that cow-pox was without general eruption and its accompanying infection; that the local vesications on the hands of dairymaids accidentally inoculated from cows had a surrounding areola, and so were like a pearl on a rose leaf; that the axillary glands became affected, but that any indisposition accompanying the casual disease was due, not to the vaccine virus, but to subsequent irritation and inflammation, and was therefore accidental, not essential; that matter for inoculation, whether of small-pox, horse-pox, or cow-pox, should be used before becoming purulent, otherwise it might be specifically ineffective; and that when variolous matter was taken to test the success of vaccination the same rule should be observed.

Jenner was quite wrong about horse-pox (or horse-grease) being the only source of vaccinia, but the question was of no essential importance. In the present day Dr. Monckton Copeman, looking to the difficulties experienced in direct variolation of bovine animals, has advanced the interesting speculation that much of the cow-pox in the prevaccination era may have been due to the transference to cows of matter from the hands of dairymaids engaged in milking whilst suffering from the slight eruption which commonly followed small-pox inoculation.

Jenner always kept in view, as a pole-star to guide him, the conviction that cow-pox was small-pox of the cow. This was hotly disputed in his own time, but has long ago been triumphantly proved and is now universally accepted. It gave him a wonderfully complete grasp of the principles and practice of his prophylaxis. When therefore Woodville, carrying on cow-pox inoculation in the very unsafe conditions of the Small-pox Hospital, seriously endangered the whole project of vaccination by reporting that in a large number of his cases there had occurred a general pustular eruption which he set down as belonging to the phenomena of cow-pox, Jenner tersely replied, "Where variolous pustules have occurred I believe variolous matter to have occasioned them"; Woodville soon came tacitly or explicitly to admit his error. For conducting safely and effectively the practice of vaccination, Jenner evolved and emphasized his "Golden Rule" to take lymph from the arm at an early stage, before the areola had appeared. This was at first not infrequently neglected, and sometimes the same vesicle was returned to again and again for lymph supply. In America the practice was extraordinarily bad, and when Waterhouse there wrote to Jenner that he had known of a shirt-sleeve stiff with purulent discharge from a foul ulcer being cut up into small strips and sold for kine-pox, Jenner replied that he longed for a speaking trumpet to carry on the wings of the wind across the ocean the message—Take the virus before the efflorescence appears.

But his doctrine was erroneous in one important respect. To the day of his death he held that the protection afforded by vaccinia was equal in every respect, including duration, to that of variola, whether natural or inoculated. When in the course of his later years post-vaccinal small-pox not infrequently occurred, his explanation was that second attacks of small-pox itself had exceptionally happened, and that so it must be with vaccination. But in Germany, where the influence of Jenner's views was no doubt less than in his own country, the need for revaccination began to be realized, and in the armies of various States compulsory revaccination of recruits was begun so long as from eighty to ninety years ago. In this country at that time it was coming to be thought that the original stocks of lymph might have deteriorated, and Ceely, Badcock, and others, adopting the policy of return to the cow, began their well known investigations. Since that time the need for revaccination has been everywhere accepted, and, in addition, new stocks of lymph can be established whenever and wherever it may be found desirable.

In the conditions of the present day we are finding that by concentration of effort, by what may be called intensive vaccination in a threatened area, it is often possible to counteract in great measure the effects of the public apathy, which is probably to be attributed to the less alarming types of small-pox and the longer intervals between epidemics in recent decennia. The groundwork is not nearly so good as before, but consists, first, in such routine practice of infant vaccination as still remains under the weak existing law, and secondly, in the very considerable amount of revaccination of male adults in the war, and of the public generally whenever there is threatened prevalence of small-pox. Even yet a considerable part of the population of the country is thus immune to small-pox, and the field for its spread is correspondingly limited. Another important present-day factor is that calf lymph is available on emergency to an extent altogether impossible when only humanized lymph was in use, and when its exiguous supply depended on the weekly vaccinations of the babies in a community. Also modern public health staffs, central and local, can, putting aside if necessary almost all other work, concentrate on the search for contacts, their vaccination and surveillance, and, if vaccination be too late, their isolation in hospitals established in well isolated situations. Isolation, however, is practicable only through vaccination. In its absence the attendants on the sick, unless indeed they had already had small-pox, would be infected by the patients. In their turn these attendants would become patients, and the disease would spread in ever-widening circles. If the whole population were protected by vaccination and revaccination small-pox hospitals would be needless; in the entire absence of vaccination they would be useless. In fact, it is Jenner who has made isolation available as a handmaid to vaccination. All this emergency effort, however, cannot but be accompanied by the toll which small-pox takes from those who are infected before they resort to the protective operation. So long as visitations of small-pox continue such loss will be an inevitable penalty for personal and national neglect.

The centenary of Jenner's death follows close on that of Pasteur's birth. Their lives overlapped by a month, Pasteur having been born thirty days before Jenner died. Their life's labours were closely related. Apart from variolation with its serious disadvantages, vaccination was the first example of the operation of the principle of individual immunization. For the greater part of a century it remained an oasis in a desert, and for long there seemed no prospect of its further application. Now, however, since Pasteur brought into existence the science of bacteriology, the sphere of immunization by different methods has been wonderfully extended, and the armamentarium of preventive medicine correspondingly strengthened. In a remarkable passage in one of his books Sir John Simon wrote that "if departed great benefactors of our race could now and then look down on the harvest fields where mankind age after age is gladdened by the fruits of their labour, they would in general find themselves less remembered than perhaps their terrestrial ambitions had desired"; but, he adds, "let the noble compensation be noted that often the thoroughness of a reformer's victory is that which most makes silence of the reformer's fame. For how can men be adequately thankful for redemptions, when they have no present easy standard, no contrast between yesterday and to-day by which to measure the greatness of them?" That question applies specially to the case of Jenner, but neither Jenner nor Pasteur can ever be forgotten. It was, if we recollect aright, in an address at the centenary of the death of Robert Burns that Lord Rosebery, speculating about the duration of personal fame, prophesied that if there were every hundred years a roll call of the famous departed, the "Adsum" of Burns would sound clear and strong all down the coming time. In the much more prosaic sphere of preventive medicine and the benefactions of science, so it will be with Edward Jenner and Louis Pasteur.

THE INFLUENCE OF PASTEUR ON MEDICINE.

IT is an appropriate coincidence that the centenaries of Jenner's death and Pasteur's birth should be celebrated at practically the same time in France. That his own nation should commemorate the centenary of Pasteur's birth as an occasion for every mark of proud respect for the great medical benefactor of mankind, who was well described as "the most perfect man who has ever entered the Kingdom of Science," is natural and right. But that our French friends of the Académie de Médecine, which has a special department organized for Jennerian vaccination, should have held a formal séance in his memory on January 23rd—three days before the anniversary of Edward Jenner's death at Berkeley, Gloucestershire, in 1823—calls for an expression of our sincere appreciation of their graceful action. Not only did the lives of these two famous men follow each other without a break, but the younger by exact laboratory methods carried on and greatly extended the bearings of his senior's clinical achievement, and with the generosity of a great mind fully recognized his predecessor's work, and did perhaps even more than justice to him by perpetuating the term "vaccine" in a much wider sense than its original and etymological application. Pasteur, in concluding the address he gave to the International Congress of Medicine in London in 1881 on vaccination in relation to chicken cholera and splenic fever (anthrax), said, "I must not end without expressing the pleasure I experience in remembering that it is as a member of an international medical congress held in England that I publish these most recent results of my experiments on the vaccination of a disease perhaps more terrible for animals than is small-pox for man. I have given to the term 'vaccination' an extension which science, I hope, will accept as a just homage to the immense services rendered by one of the greatest of Englishmen, Jenner. How great to me is the happiness to be able to honour his immortal name in this noble and hospitable city of London." From the results of his work on fermentation Pasteur became convinced that each form of fermentation is specific and due to a special organism; he then went on to show that the virus of an infection can be attenuated and employed as a vaccine to produce active immunity. In this short article the influence of Pasteur on medicine may be suitably considered as a pendant to the account in our last week's issue of his influence on surgery; and accordingly, although the important bearing of the principle of the specificity of disease (in which he took so great a part) on the outlook of medicine can hardly be exaggerated, attention will be mainly directed to the influence of his work on preventive medicine.

Long before the real recognition of bacteria Jenner noticed that cow-pox protected milkmaids from a somewhat similar but far more serious disease, variola, and, as stated in the article which precedes this, by inoculating a child with lymph taken from a cow-pock on the hand of a milkmaid, put this observation into practical use. Impressed with this idea of obtaining protection from a virulent disease by the production of a similar but slight disorder, Pasteur, dealing with the isolated virus of disease and not solely with its results, set to work to find a way of attenuating

the specific micro-organisms. This he accomplished by different methods in some of the comparatively few diseases of known bacteriology: in chicken cholera by prolonged incubation, in swine fever or erysipelas (rouget) by passing the virus through other animals, and in anthrax by cultivating the bacilli at a temperature higher (42°–43° C.) than the optimum (35° C.). In 1881, by inoculating animals with attenuated living cultures of anthrax bacilli, protection was obtained, and to this procedure, as it followed the lines of Jenner's vaccination with calf lymph, he applied the term "vaccination." This prophylactic vaccination, employed so successfully by Pasteur in the case of anthrax, was after a long interval practised by Haffkine (1895) against cholera, and on an even more extensive scale, and with great success, in protection against enteric fever by Sir Almroth Wright (1897). He, finding experimentally that dead cultures gave a protection quite as effectual as living cultures, used them to produce immunity—an innovation that rapidly found other applications.

In his work on the protective action of attenuated virus Pasteur was enormously in advance of his time, and indeed founded the science of immunity, established its practical application in obtaining protection against disease, and opened the way to the further development of specific curative treatment. In rabies, in which, as in small-pox, the causal organism has not been isolated, Pasteur was content to act on the assumption of its presence, thus anticipating and stimulating the discovery of ultramicroscopic organisms. He introduced the system of standardized vaccines in the prevention of hydrophobia during its long latent period—usually about six weeks—between the date of the bite and the onset of symptoms. By drying the spinal cords of experimental animals dead of rabies Pasteur found that the virulence of the emulsion made from them progressively diminished, so that after fourteen days their toxic properties were lost. Subsequently it has been thought, on the basis of Hogyes's therapeutic success with diluted virulent emulsions, that the process of drying alters only the quantity and not the quality of the virus. However this may be, Pasteur obtained a series of emulsions of graduated strength from spinal cords that had been dried for varying numbers of days, and by injecting successively emulsions of increasing strength into persons bitten by rabid dogs produced an active immunity so complete that the mortality in these cases has never been more than 1 per cent. According to Calmette the former mortality of persons bitten by mad dogs was as high as 47 per cent., and when the bites were on the face 80 per cent., whereas between 1886 and January 1st, 1922, out of 44,817 persons treated by Pasteur's method at the Pasteur Institute, Paris, only 150, or 3 per 1,000, have died. The Pasteur Institutes all over the civilized world tell the same tale. The treatment, however, has no effect when the symptoms of hydrophobia have appeared, and is therefore prophylactic and not curative; it is, indeed, comparable to Jennerian vaccination, which, if employed within three days of the exposure to the infection of variola, will prevent the occurrence of that disease, probably because the incubation period of vaccinia (three days) is shorter than that (ten to twelve days) of small-pox. Nevertheless this treatment in hydrophobia differed from other prophylactic vaccinations which are undertaken with the object of obtaining in a healthy person such a degree of resistance that, if and when he is exposed to infection, disease will not follow or will take a mild form. For in the case of hydrophobia it was during the natural period of incubation that the process of immunization was carried out; and, indeed, this may be regarded as a step towards the curative vaccinotherapy subsequently elaborated by Sir Almroth Wright. By establishing the existence of bacterial toxins Pasteur cleared the way for Roux and Yersin's discovery of diphtheria toxin and so for that of antitoxic serums.

To Pasteur medicine, and particularly its real aim the prevention of disease, owes an immense debt for his demonstration of the universal distribution of bacteria, of the value of accurate sterilization, and of the fallacy of supposed spontaneous generation; for the introduction of an accurate technique, and perhaps above all for the example and inspiration of a thoroughly scientific method in medical work and research. Just as he confuted the hypothesis of spontaneous generation of bacteria, so he dealt with the prevalent conception of spontaneous morbidity so obstinately supported by Liebig. In the contrast between the state of national health and the prospect of life in the civilized world now and that existing fifty years ago, the influence of Pasteur is writ large; and, as Professor F. Widal* said in his *éloge* on December 26th, 1922, at the Académie de Médecine, no science has ever experienced such a revolution as that effected in medicine by Pasteur's discoveries. In conclusion, it is fitting to quote from the Supplement to *Nature* of December 23rd, 1922, Professor William Bulloch's considered judgement: "When one calmly surveys the immense progress of medical science in the last fifty years it will, we think, be admitted by future historians that its progress and success were largely due to the work initiated with so much imagination and carried out with such incomparable skill by Louis Pasteur."

THE MODE OF ACTION OF TRYPANOCIDES.

As will be gathered from a perusal of the report published this week (p. 149), the discussion at the Royal Society of Tropical Medicine upon the new trypanocidal remedies brought out a number of points of great practical and theoretical interest as to the mode of action of trypanocides. The facts reported by Dr. Low and Dr. Chesterman showed that each of the new remedies, "Bayer 205" and tryparsamide, is a real advance on any previous remedy for the treatment of trypanosomiasis. Dr. Low described 8 cases of sleeping sickness (*T. gambiense*) treated with "Bayer 205"; 7 recovered. Dr. Chesterman gave an account of the treatment (Stanleyville) of 40 cases of sleeping sickness with tryparsamide. He expressed himself as satisfied that the action of the drug was superior to that of atoxyl or antimony. A warning note was sounded by Dr. Derwish, who said that cures could often be obtained with antimony and salvarsan, and that the length of time during which the new drugs had been on trial was really insufficient to estimate their effects on a disease so notoriously liable to irregular remissions as was sleeping sickness. The experimental and clinical evidence seems to point clearly, however, to the conclusion that the two new drugs are stronger trypanocides than any previously known substances, and that a real advance has been made in the treatment of sleeping sickness. The interesting theoretical point arises as to the nature of their mode of action. Ehrlich's theory of chemotherapeutics was simple and picturesque, and received great support from the fact that work on the lines suggested by his theory led to the discovery of salvarsan. This theory, which was a development of the side-chain theory, was that a drug could be likened to an arrow—the shaft or toxic nucleus was the substance which killed the trypanosomes, whilst side-chains or haptophoric groups served the purpose of the barb in fixing the toxophoric group to the parasite. All recent developments in chemotherapy, however, have tended to discredit this theory and to suggest that the process is much more complex. If Ehrlich's theory is correct the action of trypanocides *in vitro* should be roughly parallel with their action *in vivo*. This does not happen; even in the case of salvarsan its action *in vitro* is much weaker than that of numerous other arsenic compounds which are valueless as

* Widal, F., *Bull. Acad. de méd.*, Paris, 1922, 3e sér., lxxxviii, 646.

trypanocides; tryparsamide, which is a pentavalent arsenic compound, has very little action on trypanosomes *in vitro*, while "Bayer 205" also has a relative feeble action under the same conditions. This difficulty can be got over by supposing that the drugs are slowly changed in the body into an active compound; but all available evidence is to the effect that drugs in general, and arsenic compounds in particular, are removed from the blood stream very rapidly, and that an hour or two after an intravenous injection only a small fraction of the drug remains in the blood stream. On the other hand, Voeghtlin and Smith's work showed that the trypanocidal action of salvarsan did not commence for two or three hours—that is, not until most of the arsenic had left the blood stream. Some of the recent work on trypanosomiasis points, indeed, to a totally different conclusion as to the mode of action of trypanocides. Marshall and Vassallo found that serum taken from salvarsanized patients and injected intrathecally had a powerful curative action. The quantity of arsenic in such serum must be almost negligible, and any action the serum exerts must be due to some trypanolytic substance produced by the body. Dr. Wenyon, as will be seen, stated during the discussion on the papers by Low and Chesterman that from experiments on mice he had concluded that the intravenous injection of "Bayer 205" in man caused the formation of a trypanolytic substance, both in the blood and in the cerebro-spinal fluid, and that this substance persisted in the circulation and was present a week after the injection. These observations are of the greatest importance, for they provide direct experimental support for the view that the action of chemotherapeutic agents is not necessarily a direct one on the parasites, but that it is, in part at any rate, an indirect action. At present the general view appears to be that the drugs kill a certain number of parasites, and that the destruction of these parasites causes the formation of trypanolytic substances, which carry on to completion the work of destruction. It is obvious that this new view of chemotherapy is much more complex than Ehrlich's original side-chain theory, and a large amount of experimental work will be necessary before any certain conclusions can be reached. The elimination of an incorrect theory is, however, in itself an advance, and the new orientation of ideas should prove a valuable stimulus to research along the new lines indicated.

SMALL-POX AND VACCINATION IN THE PHILIPPINES.

IN this issue Dr. J. C. McVail presents his examination and analysis of the reports on small-pox and vaccination in the Philippines. He states briefly his provisional conclusions, but urges that futher inquiry is necessary, not by study of documents, but by actual visitation and investigation, perhaps by the Rockefeller Foundation, which has recently engaged in making a medical survey of the islands. It may, however, be permissible to state the general impression made by the facts at present available. The United States authorities on taking over the islands in 1898 were enthusiastic in their desire to eradicate small-pox, which had been so terrible a scourge under Spanish rule. To that end they decided on a vaccination campaign which was to include the whole population of the Philippines; but the difficulties in the way do not seem to have been fully appreciated. Neither the military nor civil health service could undertake the actual work of wholesale vaccination; for every detail they had to rely on Filipino or native agencies. The population to be vaccinated was ignorant, superstitious and apathetic, or actively hostile. A large proportion of the available assistants consisted of men who were not even in the lowest rank of the civil service of the islands. They included uneducated, lazy, untruthful agents, who wasted the lymph supplied to them and fabricated returns showing huge numbers of vaccinations which had never been performed. The natural difficulties also were immense—difficulties of distance and defective means of travel to remote insular groups of natives living under the worst conditions and understanding neither Spanish nor English; difficulties also of climate and transport; whilst failure of ice supply for cold storage tended to cause deterioration of vaccine, and local incompetence or carelessness favoured further deterioration. Though such conditions may not have been universal, an important initial question seems to have been the suitability of the strain of lymph to the type of small-pox locally prevalent, and the Director of Health called attention in 1910 to the short duration of immunity which he had observed in Filipinos as compared with white-skinned races. Of the vaccinations alleged to have been performed a large proportion were never inspected, and in those inspected the percentages with negative results, even in infants, was extraordinarily high. These, briefly, were some of the conditions under which the United States authorities laboured in their efforts to protect the Philippines from small-pox. The exaggerated, if not fictitious, reports which they received of vaccinations by the thousand, or the ten thousand, or even the hundred thousand, not unnaturally misled them, and at the same time there set in a great irregular decline in the prevalence of small-pox. The 19,000 deaths in 1903 fell to 9,000 in 1904, to 4,000 in 1906, to 3,000 in 1910, to 1,000 in 1911, and to a few hundreds annually from 1912 to 1916. Then, apparently under the soothing influence of this diminution in small-pox, the dishonesty of vaccinators and their subservience to local influence led to increased neglect of duty, so that in the capital city, Manila, supplies of lymph were thrown away, whilst the usual returns of vaccinations continued to be made. The awakening came with the epidemic of 1918–20. The reports show that a great new scheme of vaccination was set on foot, and was being actively carried out in 1919 and 1920. Unfortunately, however, those engaged in the new campaign seem to have met with some of the difficulties, though not all, which belonged to the earlier crusades. In this statement of the position there may easily be mistakes and misunderstandings, or even unintentional injustice, and we submit it with all reserve. Whether the survey on behalf of the Rockefeller Foundation, which was in progress in May last year, is yet complete we do not know, but pending a report by it an open mind must be kept on the whole question. Finally, it may be well to point out, though it ought to be unnecessary, that the question of small-pox and vaccination in the Philippines has no bearing on the security of this country unless by some remote chance the black or haemorrhagic strain of infection were implanted here. Britain and the rest of Europe have times without number had ample proof that small-pox, as it occurs with us, and whether mild or severe in type, is absolutely controllable by vaccination and revaccination.

VITAL STATISTICS OF PRUSSIA BEFORE AND AFTER THE WAR.

THE Prussian Statistical Department issued last year the second part of Vol. 10 of *Medizinalstatistische Nachrichten*. It is a comparative study of the last complete pre-war and the first complete post-war year (1913 and 1919). Prussia is closely comparable with England and Wales in population, and as it has been exposed to different wartime and post-wartime conditions, it is interesting to compare the results. The estimated population of Prussia in 1913 at all ages was 20,596,269 males and 21,052,793 females. In the first completed post-war year (1919) the census showed a decrease in the males to 18,816,849 and females to 20,523,598. The mean age of males in 1913 was 26.6 years, and 28.7 in 1919. There was very little change in infant mortality, the death rate per 1,000 births in the first month of life was 48.7 for 1913 and 48.3 for 1919. The births numbered 1,209,385 in 1913 and 827,335 in 1919, giving rates of 29.0 and 21.0 per 1,000 living. In England and Wales the birth rates were 23.9 per 1,000 living in 1913 and 18.5 in 1919, and the death rates in the first month of life were 44.39 and 44.49 per 1,000 births. In both countries there was an increase in the deaths in childbed, but the third wave of the great pandemic of influenza in 1919 may be assumed to account for some increase. In Prussia the decline in infantile diarrhoea was

considerable; the mortality under 1 year was 134.6 per 10,000 live births in 1913 and 44.55 in 1919. Excluding typhoid fever and influenza, the infectious diseases showed a decrease. The number of deaths from scarlet fever in 1919 was less than half that of 1913, being 2,213 against 4,506. In England and Wales 2,100 deaths were registered in 1913 and 1,221 in 1919. The deaths from measles showed a greater decline, from 7,286 to 1,270. The figures for England and Wales were 10,673 and 3,563. There was little change in the deaths from diphtheria and croup, the actual deaths being 7,550 and 7,054, and the rates of mortality at ages up to 15 were 5.42 in 1919 and 5.20 in 1913 (mortality per 10,000 living). The figures for England and Wales were 4,494 for 1913 and 4,916 for 1919, and the rates of mortality under 15 years 3.84 and 4.36 per 10,000. In Prussia the death rates from typhoid fever increased from 0.34 to 0.74 (actual deaths being 1,433 and 2,911). There was a decline in the figures for England and Wales from 1,505 to 577 (0.41 to 0.16 per 10,000). The greatest increase in the causes of deaths was under the head of tuberculosis. The totals were 56,861 in 1913 and 85,996 in 1919, and the crude rate per 10,000 increased from 13.65 to 21.86. The rates for urban districts increased from 15.81 to 27.16 and the rural from 11.65 to 16.84. In England and Wales the total deaths were 49,464 in 1913 and 46,310 in 1919. "The special characteristic of the mortality from tuberculosis in the years under consideration and that which gives rise to the greatest anxiety is the increase of mortality at young ages. Despite the end of the war, the partial improvement of feeding, clothing, and heating, normal facilities for medical treatment, and above all the declining birth rate, which would give reason to suppose that more and better attention under the more favourable external conditions of a smaller family would lead to a decline of the death rate, the number of deaths has not in fact declined but increased, a result which is doubtless to be attributed to the aftermath of the hunger blockade." The statistics of pneumonia and influenza show the effect of the great pandemic in 1919. The deaths from influenza were 1,592 in 1913 and 29,141 in 1919. In England and Wales the figures were 6,387 in 1913 and 44,789 in 1919, but the two sets of figures are not comparable owing to the differences in tabulation. The total mortality from influenza and pneumonia was 53,094 and 85,990 in 1913 and 1919, and the corresponding figures for England and Wales were 44,002 and 83,909. The cancer rate shows very little change, 10.13 in 1913 and 10.03 in 1919 for 10,000 persons at ages 30 to 60, and for persons over 60, 54.16 and 51.14. In 1920 the rate increased to 10.22 (ages 30 to 60) and 55.05 (60 and over), the latter being the highest yet recorded.

THE EXCRETION OF VITAMINS.

ONE of the first facts established about vitamins was that they could pass through the animal body unchanged; all the evidence indicates that animals cannot synthesize vitamins, but must obtain them in their foodstuffs, and yet vitamins are excreted in considerable quantities in milk provided the cow receives an adequate quantity of them in her food. Less attention has been paid to the excretion of vitamins in the urine and faeces, but in the current number of the *Biochemical Journal* there is an interesting article by Dr. Van der Walle dealing with this question. He recalls that several observers have demonstrated the presence of the water-soluble anti-neuritic vitamin in the urine. He confirms this conclusion, and shows that the urine of men or dogs contains a substance which has a strong curative action upon pigeons suffering from polyneuritis. This substance is shown to possess properties similar to those of vitamin B, for it is destroyed by heat, and is adsorbed by animal charcoal; moreover, it is absent from the urine of dogs fed on a diet free from vitamin B. Other experiments were made to ascertain whether the antiscorbutic vitamin occurs in the urine, but the results were negative. These experiments are of considerable interest, for they suggest that it may be possible to determine directly by examination of the urine whether any particular case of disease is actually suffering from a deficiency of vitamins in the food. Experiments on these lines might lead to a rapid extension of our knowledge about the influence of vitamin lack upon the occurrence of disease.

HYGIENIC METHODS OF INDUSTRIAL PAINTING.

OF the operations involved in the practice of industrial painting, that of dry rubbing down is most productive of dust. The process consists of rubbing a painted surface with an abrasive in order to smooth the surface before the application of a new coat of paint. What is commonly called sandpaper is used for this purpose; it consists of flint, emery, powdered glass, or some such material, fixed to paper or other fabric by glue. Large quantities of dust are produced in the operation, and this settles on the floor or on the painter's overall, where, being white, it is not detected, so that it often happens that a man wears an overall for days, apparently in a clean condition, but really impregnated with loose lead dust, some of which, when disturbed by his movements, enters the air and is breathed. In a paper read before the Royal Society of Arts on January 17th Mr. C. A. Klein gave an account of his investigations, which showed that the older—and consequently the harder—the paint film, the greater is the amount of small dust, and it can be detected at a distance up to ten feet from the surface at which it is created. Mr. Klein urged that a grave danger of lead poisoning attended the use of the dry rubbing-down process, which should therefore be prohibited. In view of the prevalence of respiratory diseases among workers exposed to siliceous dusts, he had analysed paint dusts and found particles of abrasive material—sand, glass, and the like—to be contained in quantity. The increased death rate from phthisis among painters was emphasized in evidence before the Departmental Committee on the use of paints containing lead in the painting of buildings, and a higher percentage of deaths due to phthisis among painters than among occupied males generally was also shown in figures from the Netherlands and from America. Apparently it was not the lead itself which was responsible, and Mr. Klein suggested that there was a case for inquiry. Crystalline silica was regarded as the principal vehicle of dust phthisis, and his own investigations went to prove that the sharp dusts of abrasives which occurred in paint dust as breathed by the painter contained free silica in a size of particle which might be regarded as dangerous to the lungs. A wet process of rubbing down has been known for many years, but for certain reasons appears to be regarded by the trade as unsuitable for general application. Lately, however, a damp rubbing down process has been evolved in which the painted surface is damped by means of a wetted sponge, and then rubbed with ordinary sandpaper, followed by the use of a clean wet sponge to remove the paint and abrasive material in a dustless condition. The "dust figure" in this process has been shown by experiment to be negligible, and in the opinion of expert painters the surfaces obtained are smoother than those obtained by the dry process. The National Federation of Master Painters of Great Britain has expressed its approval. In America a new waterproof abrasive paper was said to be a distinct improvement on ordinary sandpaper for this purpose. Dr. T. M. Legge, the Chief Medical Inspector of Factories, who presided over the meeting, thought the new procedure very welcome, although on the administrative side he was a little doubtful about the possibility of securing its general adoption, in view of the fact that the painting trade, like all others, is largely governed by tradition. With regard to the question of fibroid phthisis in the house painter, Dr. Legge deprecated anything in the nature of a "stunt," such as that which took place a couple of years ago in connexion with the same condition among printers. It was very tempting to investigate the conditions of the atmosphere, to work out certain not too convincing statistics, and on finding silica dust in the air to say, without reference to the persons concerned, or any study of their particular cases, that as a form of phthisis was due to silica dust the phthisis occurring in the craft must be

due to this cause. He doubted whether the quite definite condition of fibroid phthisis had been found in the lungs of house painters any more than in those of men of other trades. Sir Kenneth Goadby, who also took part in the discussion, said that he was in some measure responsible for the initial suggestion that the silica dust in sandpaper might be associated with phthisis, if in fact the phthisis reached a high incidence, but there was not sufficient statistical evidence that house painters showed so large an excess of phthisis of a type which could be attributed to dust of this nature.

VIBRATING SENSATION.

WHEN the foot of a vibrating tuning-fork is placed over subcutaneous bony prominences or surfaces, in many parts of the body, a peculiar vibrating sensation is felt. To this sensation the names of "vibrating sensation or feeling," "bone sensibility," and "pallaesthesia" have been given. A clinical lecture by Dr. R. T. Williamson of Manchester on the value of the vibrating sensation in the diagnosis of diseases of the nervous system was published in our columns in 1907 (vol. ii, p. 125). It was pointed out there that the method was a delicate test for detecting slight impairment of sensation. Dr. Williamson has given an account of his further observations on the subject in a paper recently published in the *American Journal of Medical Sciences*.[1] He has continued to employ the method as a routine, using a large tuning-fork seven and a half inches long (A. 440) with an oval metal footpiece. He finds that suitable points for testing the sensation are the inner surface of the tibia, the malleoli, the anterior superior iliac spine, the nail of the big toe, the sternum, and the styloid process of the ulna. Normally the vibrating sensation is felt on the points mentioned. In many diseases the vibrating sensation is lost when other forms of sensation (for touch, pain, temperature) are retained; and it is often the first form of sensation to be lost. In many diseases it is never lost even up to the end of the affection. For this reason Dr. Williamson believes the vibrating sensation is often of value in differential diagnosis; sometimes it is of service in the localization of spinal lesions. In multiple peripheral neuritis from alcohol, and in diabetic neuritis, loss of the vibrating sensation can usually be detected before loss of any other form of sensation. In these cases four valuable early signs are pain in the legs, tenderness of the calf muscles, loss of the tendo Achillis jerks, and loss of the vibrating sensation. In the differential diagnosis between peripheral neuritis and anterior poliomyelitis (acute or chronic) the vibrating sensation is often of service, since it is never lost in anterior poliomyelitis, but is usually lost very early in peripheral *multiple* neuritis, though at first other forms of sensation may be felt. In the diagnosis between anterior poliomyelitis and acute disseminated myelitis or myelitis not limited to the anterior horns, the vibrating sensation is of service; if lost the disease is not limited to the anterior horns of grey matter. In an early stage of combined postero-lateral degeneration or sclerosis the chief indications may be loss of the vibrating sensation on the legs, slight inco-ordination in walking, or affection of the muscular sense in the legs, and an extensor type of plantar reflex. In disseminated sclerosis, if sensation should be affected, the most common early form of sensory impairment is loss of the vibrating sensation. It may be lost on the legs, or on the legs and abdomen, or on the abdomen only. The abdominal reflexes are often lost and the plantar reflexes are often of the extensor type at this early period. In compression myelitis from vertebral caries, or tumour in the spinal meninges, at the early stage, if sensation be affected, the vibrating sensation is usually lost before other forms of sensation, and the same is true of Erb's form of spinal syphilis. The vibrating sensation is occasionally of service in the diagnosis between functional or hysterical anaesthesia and anaesthesia due to organic disease (and between functional and organic hemianaesthesia). When the foot of a vibrating tuning-fork is placed at one point over a bone the vibrations are felt, not only at that point, but (though with diminishing intensity) at all parts. If one part of a bone, such as the sternum or tibia, be in an area of anaesthesia and another part not, then, if the foot of the vibrating tuning-fork be placed on the bone in the anaesthetic area, the vibrations, if not felt there, should be felt at the distant part of the bone, in the non-anaesthetic region. If this should not be so, then the case is one of hysteria or malingering.

[1] Vol. clxiv, No. 5, p. 715.

INTERNATIONAL AIR CONGRESS, 1923.

AN International Air Congress will be held in London this year, from June 25th to 30th, at the invitation of the British Government, under the presidency of the Duke of York, who holds the rank of Group Captain in the Royal Air Force. Lord Weir is vice-president of the Congress, and the Duke of Sutherland, Under Secretary of State for Air, is chairman of the main committee. The chief object of the Congress is to provide opportunities for the reading and discussion of papers on every aspect of air matters; it will be divided into four groups, each again divided into subgroups, which will meet simultaneously. Group A will deal with methods of research, aerodynamics, and similar subjects; Group B with fuels and lubricants, etc.; Group C will discuss air transport and navigation problems, under the heading of (1) technical aspects, (2) engineering problems, (3) commercial, legal, and financial problems, and (4) medical aspects; Group D will devote itself to airship design and the military utilization of civil personnel in machines. The reading of papers will occupy the Monday, Wednesday, and Friday of the week, while Tuesday and Thursday will be devoted to visits to various places of interest. The Air Ministry have arranged for an air pageant on Saturday, June 30th. Further particulars and a form of application for membership of the Congress may be obtained from Lieut.-Colonel W. Lockwood Marsh, general secretary of the Congress, c/o the Royal Aeronautical Society, 7, Albemarle Street, London, W.1.

THE INTERNATIONAL PHYSIOLOGICAL CONGRESS.

IT has already been announced that the eleventh International Physiological Congress will be held in Edinburgh next July (23rd to 28th), under the presidency of Sir Edward Sharpey Schafer. The first meeting of the Congress was held in 1889, and it met in Cambridge in 1898; since then it has not visited Great Britain. The Congress met in Groningen in 1913, and not again until 1920, when it assembled in Paris. A meeting of the General Committee of Organization has been held this week in Edinburgh, under the presidency of the Lord Provost, who expressed his appreciation of the honour done to the Scottish capital by its choice as the meeting-place of the Congress this year, and the compliment thus paid to the worldwide scientific reputation of the University of Edinburgh, and in particular of its medical school. The Lord Provost said that the corporation of the city would extend a hearty welcome to the illustrious visitors expected, and expressed the expectation that the citizens would readily offer private hospitality. On the motion of the Principal of the University (Sir Alfred Ewing), seconded by Sir George Berry, M.D., M.P., the appointment of Sir Edward Sharpey Schafer as president, made at the Congress in Paris, was confirmed, as were also the appointments of Professor A. R. Cushny, F.R.S., as treasurer, and of Professors O. Barger and J. C. Meakins as joint secretaries. An executive committee was appointed on the motion of Professor G. L. Gulland, seconded by Dr. J. L. Ewing, and committees for hospitality and for making scientific and social arrangements were also appointed. The meeting was brought to an end by a vote of thanks to the chairman, proposed by Sir Edward Sharpey Schafer, who expressed gratitude to Lord Provost Hutchison for his sympathetic interest in the Congress and his cordial promise of co-operation. We understand that inquiries may be addressed to the assistant secretary, Miss Dorothy Charlton, at the Department of Physiology, the University, Edinburgh.

MURDERS.

THE White Paper (Cmd. 1787 of 1922) recording the number of cases of supposed murder in England and Wales in 1912, 1913, 1920, and 1921 (excluding cases of infanticide of children under one year by mother and deaths from illegal operations) is an interesting example of the fact that a popular impression may be altogether false. We think that anybody would have expected *a priori*—we certainly did ourselves—that the habituation of so many thousands of men to deeds of violence, the tale of horrors which were our daily fare for so many years, would be reflected by a sensible increase in the frequency of violent crimes after the war. But, so far as cases of supposed murder are concerned, the expectation is falsified. In 1912 there were 98 supposed murders, in 1913 there were 100, in 1920 there were 107, and in 1921 only 85. In 1921 a somewhat smaller proportion of persons were convicted, either of murder or a lesser crime, in connexion with the cases than in the other years. Thus in 1912, 38 persons were convicted of murder, 25 of manslaughter, and 2 of feloniously wounding—65 convictions with respect to 98 cases; in 1921, 23 persons were convicted of murder, 14 of manslaughter, and one of maliciously wounding—38 convictions for 85 cases; but in each of these years 7 suspects were found to be insane; 16 murderers committed suicide in 1912, and 22 in 1921; so that 88 out of 98 in 1912, and 67 out of 85 in 1921, may be said to have been accounted for—percentages respectively of 90 and 79. The net result is that neither in frequency nor in immunity from detection does the post-war experience of murder differ very much from that of pre-war times.

PASTEUR—THE ARTIST.

AT the celebration of the hundredth anniversary of the birth of Pasteur, which is to take place at the Royal Society of Medicine on February 28th, the President, Sir William Hale-White, will give a short address, and Dr. Gustave Monod, of Paris and Vichy, will read a paper, illustrated by lantern slides, on "Pasteur—the artist." Pasteur early showed a taste for drawing; his inclination in this direction was in fact a source of some anxiety to his father. He began to attempt portraits in coloured chalks: one of the earliest, done when he was a boy of about 13, was of his mother; it is said to be not unlike the work of a conscientious pre-Raphaelite. The reproduction we have seen in black and white in *l'Illustration* is spirited. It shows a middle-aged woman, with sharp, alert features, wearing an old-fashioned frilled cap and check shawl. When, after his short experience in 1838 of the Lycée St-Louis, in Paris, he returned to his home at Arbois, he made a number of pastel portraits of local celebrities and friends of his family. Among the portraits he did at this date was one of his father, a sedate contrast to his mother; it shows a middle-aged man, with features not unlike those of his great son, wearing the stock and thick roll coat-collar of the period. Within a year, however, Pasteur had gone to the college at Besançon; he worked hard and took the degree of Bachelier ès lettres in August, 1840; and his artistic ambitions seem never to have revived.

WE have to announce with very great regret the death, on January 23rd, of Dr. J. W. Ballantyne of Edinburgh, after a short illness, which necessitated an operation from which he did not rally. We intend to publish a notice of his life and work in an early issue.

THE Milroy lectures on canned foods in relation to health will be given before the Royal College of Physicians of London by Dr. W. G. Savage, on February 22nd and 27th and March 1st; Dr. Geoffrey Evans will deliver the Goulstonian lectures on March 6th, 8th, and 13th, on the nature of arterio-sclerosis; and Dr. Arthur J. Hall will give the Lumleian lectures on encephalitis lethargica (epidemic encephalitis) on March 15th, 20th, and 22nd. The lectures will be delivered at the College, Pall Mall East, S.W., at 5 p.m. on each day.

England and Wales.

THE HASLEMERE AND DISTRICT HOSPITAL.

THE new hospital of thirty-five beds, for Haslemere and district, which has been built at a cost of £32,000, was formally opened on Saturday, January 20th, by the Lord Chancellor, Viscount Cave, in the presence of a large company. The hospital needs of the neighbourhood have hitherto been served by the Hindhead and District Cottage Hospital, with twelve beds, which was founded in 1897. In declaring the new hospital open, Lord Cave remarked on the wisdom of those who still favoured the maintenance of the voluntary hospital system. He disagreed altogether with the short-sighted view that all hospitals ought to be State institutions. He was well aware that the Poor Law infirmaries did much good work, but the fact remained that they could not deal with out-patients. Moreover, it was impossible to get in State institutions the same constant, thoughtful, daily care which was given by doctors and nurses alike in the voluntary hospitals of this country. The committee of inquiry of which he was chairman received evidence from countries in which the hospitals were entirely State institutions. It appeared from this that in such hospitals there was no one, apart from the patient's relatives, whose duty and pleasure it was to see him from day to day, to watch over his comfort, and give him that personal attention which meant so much to a sick person. Moreover, the voluntary hospitals in this country had the enormous advantage of being worked by the medical profession. He thought it was not generally realized to the full how much the public owed to doctors for the great voluntary work they gave to these institutions.

THE NEW SPIRIT IN PSYCHIATRY.

The annual report of the Derby Borough Mental Hospital for 1921 reproduces the report of the Commissioners of the Board of Control on their visit of inspection to that institution towards the close of the year. The following observation of the Commissioners seems of general interest and worthy of quotation as a sign of the modern attitude towards the scope and purpose of a mental hospital:

"We are glad to hear that the committee's resolution to appoint a visiting dental surgeon, which was passed in 1914, but delayed in operation by the war, is likely to mature shortly; and we hope it may lead up to the appointment of other visiting specialists. We saw, for instance, among the thirty-six patients whom we found in bed, several cases for whom expert surgical opinion would be of value. The proximity of the institution to the well known general hospital in the town leads us to express the further hope that it may some time be found possible to institute out-patient work in mental disorders at the latter, and that for this purpose the experience of the medical staff here could with advantage be made available."

Scotland.

SCOTTISH POOR LAW MEDICAL OFFICERS' ASSOCIATION.

THE annual report of the Scottish Poor Law Medical Officers' Association recalls that the Scottish Committee of the British Medical Association interviewed the Scottish Board of Health in regard to the question of tenure of office, but failed to move the Board. Attempts have been made to rectify the anomalous position of Scottish Poor Law medical officers for many years past, but so far without result. It is manifestly unfair that English Poor Law medical officers should have an appeal against injustice, and also that medical officers in the crofting counties in Scotland should have what amounts to similar protection, while medical officers in the rest of Scotland hold their appointments at the absolute caprice of the parish councils. The intention of the Association is now to approach the Council of the British Medical Association and to endeavour to obtain its assistance in approaching Parliament by a private bill. Some correspondence took place during the year in regard to Poor Law medical officers supplying drugs out of their salaries. The advice was given that the Scottish Board of Health did not approve of drugs being included in the salary of the Poor Law medical officer, and that to supply drugs out of the Poor Law medical officer's salary was illegal, except in cases where it was specifically mentioned in the agreement.

In no case during the year was it found necessary to take any action in regard to vacant appointments. A recent Act authorizes the granting of superannuation to all local government officials, including medical officers; it is contributory, but voluntary on the part of parish councils, and the report raises the question whether many parish councils will be likely to adopt the Act.

Queen Victoria Jubilee Institute.

The Lord Provost of Edinburgh presided over the annual meeting, on January 16th, of the Scottish Branch of the Queen Victoria Jubilee Institute for Nurses. In regard to the financial position of the Institute, the Lord Provost said that it was a matter of grave anxiety for the council to report that there was a deficit of £6,125 on the ordinary revenue account for the past year. That had been met to a certain extent by a number of legacies and the proceeds of special appeals, leaving a net deficit of £1,213, and after the accounts were made up a grant of £2,000 was received from the Scottish Branch of the Red Cross Society. It was evident, however, that the regular occurrence of such windfalls could not reasonably be expected, and the state of the finances represented a serious position. Professor T. H. Bryce (Glasgow) emphasized the very extensive ramification of the work of the Institute throughout Scotland. They had now 341 affiliated nursing associations, of which 28 had been added during the past year. The Board of Health recognized that in the organization provided by the Institute there was a suitable basis for building up that national domiciliary nursing service at which it aimed. Sir Norman Walker said that domiciliary nursing properly carried out could prevent a great deal of disease, and that was one of the most important points of nursing work. They wanted to arouse a healthy conscience in every section of the community. Dr. Walter Elliot, M.P., the new Under Secretary for Health for Scotland, spoke of the importance of domiciliary nursing, for it was often the turning point between sending a patient to an overburdened hospital or keeping him at home. He was especially interested to find that the Institute had been able to work with the Scottish Board of Health. The essence of the preventive side of disease was voluntaryism and not compulsion. They could not carry out preventive work without the co-operation of the people in the home.

Royal Glasgow Asylum for the Blind.

At the annual general meeting of the Royal Glasgow Asylum for the Blind, held on January 15th, Mr. Joseph Waugh, chairman of the managers, said that during the past two years they had had many meetings with the representatives of local authorities, the Scottish Board of Health, and others with a view to adjusting the conditions under which the duties hitherto performed by the managers would fall to be carried out by those who succeeded them in office. A Parliamentary bill had already been framed, and it was assumed that it would become law without opposition. This bill provided that the asylum would be handed over in its present complete and active state, that they should be relieved of every obligation, and that the whole future charges would fall on the public funds. They were interested in seeing that the work should be carried out efficiently, and they might rest assured that it would not be prejudiced by the proposed change of ownership and responsibility. Deaf and dumb institutions, associations to help the physically and mentally defective, and asylums for the blind were all means of educating the public mind in its duty and responsibility, and with society in a state of development it was inevitable that the time should come when it would not be possible by voluntary means to provide the money required for such work. In agreeing to the transfer of the Royal Asylum it should not be thought that the managers had failed in their duty to the blind, because that was not true; they handed over to their successors buildings and equipment in a high state of efficiency.

Ireland.

Sweepstakes for Charitable Purposes.

On more than one occasion within the last year or so circulars have reached England from Dublin asking the recipients to invest money in a sweepstake; after paying for certain prizes the profits were to go to some charitable object. The last we have seen was about a sweepstake, the object to be benefited being a cancer fund. The subject was a matter of discussion recently in the Irish Free State Parliament. It was raised by a Labour member, who asked the Minister for Home Affairs to state what his intentions were with regard to exceptions under the Lottery Act, and to outline the policy of the Government, as there were people who believed that Ireland was a second Monte Carlo. In reply, Mr. Kevin O'Higgins said that early last year the Provisional Government had in several instances given undertakings not to enforce the law. The matter had been carefully considered with the view of ascertaining whether it would be possible to make exceptions in favour of sweepstakes for charitable purposes; he had come to the conclusion that there was no middle course, and about a month ago it was decided that no undertaking should in future be given not to enforce the existing law. Charitable institutions would have to find other means of support. The sweep evil, Mr. O'Higgins continued, was spreading. Things had got long past the stage of sweeps being run for charitable institutions. People went to an institution deserving of charity and said, "You could do with £5,000, and we could do with £10,000. Could we use your name for a sweep?" Mr. Gorey congratulated the Minister on making "a clean sweep of the sweep."

Correspondence.

TURPENTINE OR LEAD POISONING A CAUSE OF PUNCTATE BASOPHILIA.

SIR,—In the BRITISH MEDICAL JOURNAL (January 20th, p. 103), in an article on "The blood as guide to early diagnosis in lead poisoning," Dr. Robert Craik makes the statement:

"It is safe to say that, in the absence of serious anaemia, punctate basophilia is more likely to be caused by lead than by anything else."

It is not generally known, even by experts, that inhalation of turpentine vapour can also cause basophilia indistinguishable from that produced by lead. The only reference I have seen to this is in a Blue Book on lead poisoning by paint (Cd. 7882, 1921, p. 60), wherein Sir K. Goadby found in experiments on animals that "basophilia staining was found with both turpentine and white lead, and even the animals exposed to zinc oxide and zinc sulphide showed the presence of a few basophils in the blood."

Since painters are the most likely people to suffer from lead poisoning, and since in their work the effects of lead and turpentine (or its substitutes) cannot be disentangled, it is important to realize that basophilia may be produced by turpentine as well as lead, especially in legal cases.

Can basophilia also be produced by turpentine substitutes—for example, white spirit—which are cheaper and widely employed? I fancy this point has not been determined. But I investigated a year ago the comparative toxic effects of turpentine and white spirit (and paints) on vegetable protoplasm (moulds and bacteria). I concluded that they both had slight toxic effects. Also from the available evidence I thought that men working in these vapours were upset by them at first, but soon became accustomed to them, after which their health was not appreciably affected. Any action produced by large or summated doses of the two substances seemed to be similar on the kidneys, the skin (dermatitis), and the nervous system. In the two latter instances it may well be a fat-solvent effect. But I have found no opportunity of studying the effects on the health (or blood) of men working in varnish alone. Here the problem would not be complicated by the effects of lead. If anyone has the chance of comparing the effects of turpentine and white spirit vapours in varnish workers I should be glad if he would let me know, or publish the results.—I am, etc.,

F. C. EVE, M.D., F.R.C.P.,
Senior Physician, Royal Infirmary, Hull.

Hull, Jan. 22nd.

EFFECT OF ANAESTHETICS ON THE LUNGS.

SIR,—The communication by Dr. R. J. S. McDowall (January 13th, p. 61) raises questions of particular import, inasmuch as there is a tendency to advocate deep ether anaesthesia, particularly for operations on the upper air tract. I believe it is claimed that the resulting tranquillity of the patient offers advantages to the operator without adding to the anaesthetic risk. But the light ether anaesthesia adopted in Bristol for many years past, as far as my experience goes,

affords all the tranquillity to be desired for the majority of cases, and appears to lessen the risks of post-operative pulmonary complications, and this, if true, is a matter of great moment.

Dr. McDowall states that the abolition of the bronchiole function must necessarily throw a greater strain on the alveoli and cause them to be exposed to particles which otherwise would not reach them. It seems to me that localized bronchiolar paralysis, so far from throwing a strain on the corresponding alveoli, results in their collapse, and the only particles that would reach them in consequence would be organisms which spread down from the paralysed bronchiole, no longer capable of contractions, expelling abnormal secretions. In 1903 I published an article "On the rhythmical contractions of the bronchiolar muscular coat as a factor in pulmonary disease,"[1] and I suggest the effect of anaesthetic bronchiolar paralysis is analogous to a similar condition induced by acute inflammatory myositis. The far-reaching import of rhythmical bronchiolar contraction in pulmonary pathology is perhaps somewhat underestimated.—I am, etc.,

Clifton, Bristol, Jan. 15th. P. WATSON-WILLIAMS, M.D.

APITUITARISM AND THE ANENCEPHALIC SYNDROME.

SIR,—Dr. F. J. Browne's letter in your issue of January 13th has made quite clear that in his original article he included both hypopituitarism and apituitarism in his theory of the etiology of the anencephalic syndrome.

It is possible that Dr. Barlow's reference to "hypoplasia of the thymus" is a verbal error, for I believe it is generally recognized by those who have experience in ante-natal pathology that in the anencephalic foetus the thymus is more often enlarged than not. In eleven non-macerated specimens I found the ratio of thymus weight to body weight to be as 1 to 100, 131, 133, 145, 149, 158, 162, 170, 207, 230, and 318 respectively.

I regret that I did not make a microscopical examination of the tissue occupying the pituitary region. It is well, however, to remember that the histological appearance of a tissue is not always an indication of its functional activity; the pituitary cells found in Dr. Barlow's specimens may have been physiologically abnormal.

In the examination of my specimens I found all the characteristic abnormalities which have been grouped together as the anencephalic syndrome. Furthermore, I have noted that the percentage of other developmental errors, such as kidney deformities, in cases of anencephaly is higher than in non-anencephalic foetuses. I have also been able to confirm the observation of P. S. Abraham (1883) that the musculus sternalis is frequently present.

All will agree that the gross irregularities found in anencephaly are very generalized in distribution. In the ductless gland system alone three at least (pituitary, thymus, and suprarenals) are frequently abnormal, and I do not think that we yet possess sufficient evidence to prove that the pituitary gland is the ringleader.—I am, etc.,

Liverpool, Jan. 15th. NORMAN B. CAPON.

ADDER BITE.

SIR,—The interesting account of viper bite by Dr. Bernard, and translated by Dr. A. S. Gubb of Algiers (January 6th, p. 41), recalls a personal experience some years ago at Plataea on the Grecian coast.

Late one night a brother officer was brought to me suffering from a recently inflicted bite of the left index finger by a two-horned viper, which a day or two before he had found ashore amongst the rocky soil, and had in the interim kept in a cigar box. On the night in question, in attempting with his left index finger to arouse the snake in its somnolent (hibernation) state, it suddenly awoke and inflicted the injury as stated above. Two distinct punctured wounds were to be seen on the pulp of the left index finger, with but little bleeding or pain. I immediately placed a ligature around the wrist and freely excised the area of the bites, applying potassium permanganate in powder. The patient was placed in bed, with frequent and regular doses of alcohol.

In the course of the next three days the left arm became extensively swollen and of a bluish tint, together with involvement of the septal gland above the elbow and all the axillary glands. Temperature 101° F. From the fourth day the conditions noted gradually subsided, the alcohol being replaced by a diffusible stimulant mixture, and in less than three weeks both local and constitutional conditions were entirely recovered from.

The snake was about two feet in length, of a greyish body with black patches, and two well marked horns surmounting its head.—I am, etc.,

Bournemouth, Jan. 14th. W. EAMES, Surgeon Rear-Admiral R.N. (retd.).

NYSTAGMUS.

SIR,—Is nystagmus occurring in miners an entity by itself, or is it the same as nystagmus occurring in people who are not miners? Dr. Lister Llewellyn says they resemble each other. It has always seemed to me that they are identical, even in their etiology. Common to all cases of nystagmus is imperfection or absence of retinal images. Exceptions to this rule are cases of labyrinthine origin, cases that are hereditary, and cases occurring as terminal manifestations of a general disease—that is, cases that are not peripheral but central in origin.

In your issue of January 6th you take notice of Mr. A. S. Percival's paper, "A neglected factor in the etiology of miners' nystagmus." Mr. Percival wrote: "I submit that, say, 5 per cent. of all children born have a predisposition to the disease, and if they have not this predisposition they will never acquire it." This submission, I presume, applies to nystagmus occurring in children.

During the last two years I have seen twelve children suffering from nystagmus. Eleven of these children had decided degrees of ametropia; five of them had hypermetropic astigmatism, two mixed astigmatism, and four myopia of 6 D. and upwards. (Other observers may be able to confirm or dispute this association.) Had the ametropia and the consequent defective vision from imperfect retinal images nothing to do with the production of the nystagmus in these cases? From observations made in Glasgow I found that only 10 per cent. of all cases of nystagmus were miners, and now I ask the question: Is the term "miners' nystagmus" not a misnomer?—I am, etc.,

Cambuslang, Glasgow, Jan. 20th. J. A. WILSON.

VITAMIN CONTENT OF CERTAIN PROPRIETARY PREPARATIONS.

SIR,—The managing director of Messrs. Virol (Mr. A. E. Canney) complained, in a letter published in your last issue, that our article on the vitamin content of certain proprietary preparations was "apt to produce a misleading impression in the minds of medical men." We fail to see that he has proved this charge. Our aim, as he recognized, was to determine whether the proprietary preparations examined contained vitamins in a concentrated form. We found that they did not, but Mr. Canney has stated that "as regards Virol nothing of the sort has been attempted, and no such claim has ever been made."

We made no reference to any property of Virol other than its vitamin content, and therefore any discussion of its other virtues is beside the point. We cannot see that we have misled the medical profession in any way.—We are, etc.,

University College, London, Jan. 22nd. KATHARINE H. COWARD. A. J. CLARK.

DANGEROUS DRUGS REGULATIONS.

SIR,—It is to be hoped that the paragraph on page 8 of the *Times* of January 13th will not escape the attention of the medical profession. It is headed "Dangerous Drugs Act—Right of Entry to Doctors' Houses," and sets forth the "means of inspection" approved by the Home Office, as follows:

> "This, in the case of doctors and dentists, is to be carried out by medical officers of health, who will have the right of entry to premises without giving previous warning."

Surely no such insult has ever been offered to the profession as a whole. The thing is hardly credible, yet when one turns to the Memorandum on the Dangerous Drugs Act published in the BRITISH MEDICAL JOURNAL of the same date one finds the position to be as stated in the *Times* (see paras. 33–35 *re* Inspection).

Is the profession to which one has devoted one's life fallen so low that one's stock of opium pills must be counted, one's tinctures and solutions sampled for analysis, and the ingredients of one's prescriptions disclosed at the demand of the medical officer of health (possibly a rival practitioner), entering one's private house in one's (probable) absence, and "without previous warning"? It is already ordained, while

[1] *Bristol Medico-Chirurgical Journal*, March, 1903, p. 1.

we politically and journalistically are asleep. To this depth has the legislating mania of cranks and faddists reduced the once noble profession of the healing art, for the supposed benefit of a clique of degenerate addicts in the capital of the country, whose notoriety has aroused the maudlin sympathies of the newspaper-reading public.

Having no desire to be the first victim of the New Inquisition, I beg to subscribe myself by a *nom de plume*, but I will gladly volunteer to form one of the raiding party when inspection has to be made (without giving previous warning) of the house of the medical officer of health.—I am, etc.,

January 15th. PRACTITIONER.

*** Since it affects part of our correspondent's argument we should point out that the *Times* was in error in stating that the inspection of registers and records will in future be carried out by medical officers of health. By reference to the full text of the memorandum published in our columns of January 13th (p. 69) it will be seen that paragraph 1 states "that it has been arranged that as a general rule this work shall be carried out in England and Wales by medical officers of the Ministry of Health, and in Scotland by medical officers of the Scottish Board of Health." Paragraph 34 states that the Home Secretary has authorized these officers, and apparently no other persons, to act as inspectors. We are informed that hitherto such inspection, at least in some districts, has been entrusted to police officers! We may add that the Council of the British Medical Association at its last meeting instructed the Medico-Political Committee to inquire into the working of the Dangerous Drugs Act so far as it affects medical practice.

CADET ORGANIZATION AND PREVENTIVE MEDICINE.

SIR,—In the daily round and common task it falls to my lot to observe scholars and adolescents from the anthropometric viewpoint. One fact stands out clearly—the evil influence exerted by the great war on the stamina of the 1905–8 age groups (1,600,000 lads). Rickets defect prevails in many children of the later groups. Overcrowding, faulty nutrition, absence of parental control, and State neglect have played their parts in this deplorable business.

Surely the time has arrived for the introduction of a universal cadet system, so that these 1905–8 age groups may benefit by discipline, games, and ten days' annual holiday camp. In the mother country Lord Haig's training area organization, at present in skeleton form, will serve us well, if made incarnate by these lads. The Australasian cadet costume, modified to suit our climate, affords an object lesson in cheap and hygienic clothing. For instructional staff, there already exists ample talent in this country.

Preventive medicine will never come into its own until we attain to a carefully planned routine for the guidance and kindly control of all our youths. The scrapping of the continuation schools renders an all-embracing cadet system imperative and urgent. No new Ministries are needed—the machinery is to hand. It rests with the members of our profession to insist upon its being set working, for we possess the confidence and affection of the nation in our exacting and dangerous calling, and our warnings will be heeded.—I am, etc.,

R. J. E. HANSON,
Surgeon Captain R.N.V.R.; Honorary Secretary of the Imperial Cadet Association, A.M.O. (Schools).

71, Pall Mall, London, S.W.1, Jan 22nd.

Obituary.

HORATIO PERCY SYMONDS, F.R.C.S.EDIN.,

Late Surgeon, Radcliffe Infirmary, Oxford.

WE regret to record the death on January 16th of Mr. H. P. Symonds, formerly surgeon to the Radcliffe Infirmary, Oxford. He was born in 1851, the son of Mr. Frederick Symonds, a well known surgeon in Oxford in his day. Horatio, who was the seventh of his line in uninterrupted descent to belong to the medical profession, was sent to Rugby under Temple, and from there went to study medicine at University College, London. In his student days he went out as a dresser to a field ambulance in the Franco-Prussian war in 1870. He took the diploma of M.R.C.S.Eng. in 1874, and held the post of house-surgeon to University College Hospital.

In 1878 he was appointed surgeon to the Radcliffe Infirmary, and in the same year he took the diploma of F.R.C.S.Edin. He remained surgeon to the Radcliffe Infirmary for thirty-seven years, and was surgeon, and afterwards consulting surgeon, to Faringdon and Abingdon Cottage Hospitals, and to the Warneford Asylum, Oxford. He was also lecturer on surgery in the University. At University College Hospital he numbered among his friends Marcus Beck, and from him and Sir Rickman Godlee he was led to appreciate the value of Lister's teachings, which he at once applied when he entered upon independent practice. He kept himself acquainted with current surgical literature, and was always ready to put into practice new methods and ideas which commended themselves to his judgement. Not only was he a bold and speedy operator, but his surgical opinion was highly valued by his colleagues. Many of his house-surgeons will remember with gratitude the kindly help and encouragement they received from him and the opportunities he gave them of acquiring a practical knowledge of surgery. We are indebted to Dr. W. J. Turrell for the following:

"As house-surgeon of the Radcliffe Infirmary for two years during the early nineties, I was afforded an exceptional opportunity of forming an opinion of the value of Mr. H. P. Symonds's services to the hospital during a period when he was at the zenith of his powers as a surgeon. The chief impression left on my mind is the whole-hearted manner in which he devoted his life to surgical progress at a time when the recent introduction of antiseptics had so widely increased the scope and range of operative surgery. It was his quick appreciation of the possibilities opened up by the new methods and his careful attention to their most minute detail that gained for him his success as a surgeon, and enabled him to place and maintain the Infirmary in a leading and foremost position among provincial hospitals. His most striking characteristics were his punctuality, the rapidity with which he formed his decisions, the quickness with which he put them into action, and the precision with which he carried them out. His decisions, so rapidly formed, were strengthened by opposition and confirmed by contradiction, but were readily modified by tactful suggestion. He was always ready to try any new operation, instrument, or surgical method, adopting those which proved of benefit or utility, and quickly discarding those which failed to yield good results; in this way he instilled through the hospital a spirit of keenness and enthusiasm. As a teacher his example was invaluable; he was the kindest and most generous of friends, always appreciative of the work of others. The writer of this brief note is one among the many who will ever have cause to hold him in the most grateful and affectionate remembrance."

He was for many years an energetic member of the Committee of Management of the Radcliffe Infirmary; he attended regularly the meetings of the Oxford Medical Society and of the Oxford Division of the British Medical Association; in 1904, when the Association met at Oxford, he was president of the Surgical Section. He was surgeon to the Queen's Own Oxfordshire Hussars, and when the Territorial Force was formed became surgeon to the 3rd Southern Hospital, with the rank of lieutenant-colonel. Soon after the war broke out, however, he was compelled greatly to curtail his activities owing to arthritis of the hip; the condition made rapid progress, and before long he was unable to walk—a great privation to him, as he had always been a man of very active habits. "All through his life," a writer in the *Times* (we understand Sir Herbert Warren) has said, "he had been a friend of the athletes. He had helped to train and advise many an Oxford eight, and year after year was to be seen stepping on the Oxford steamer at Putney to follow the race."

Mr. Symonds married in 1893 Miss Lecky, and leaves his widow and a son, Captain R. F. Symonds, who served in the war in the Oxfordshire and Buckinghamshire Light Infantry, to mourn his loss. The funeral took place on January 19th at Holywell cemetery, after a service at St. Giles's Church, which was very largely attended.

The Services.

FOREIGN DECORATIONS.

THE King has granted permission for the following recipients to wear the decorations conferred upon them in recognition of valuable services rendered during the war.

By the King of the Belgians.—Order of Leopold II, Cross of Commander: Dr. Alexander Granville, President of the Sanitary, Maritime, and Quarantine Council of Egypt. Order of the Crown, Cross of Chevalier: Dr. Joseph M. Coplans.

By the King of the Serbs, Croats, and Slovenes.—Order of St. Sava, Insignia of the Fifth Class: Mrs. Sophia B. J. Smith, M.D.

VITAL STATISTICS FOR ENGLAND AND WALES, 1922.

WE are indebted to the Registrar-General for the following statement regarding the birth rates and death rates and the rates of infantile mortality in England and Wales and certain parts of the country during 1922.

ENGLAND AND WALES.

Birth Rate, Death Rate, and Infant Mortality during the Year 1922 (Provisional Figures).

	Birth Rate per 1,000 Total Population.	Death Rate per 1,000 Population (Crude Rate).	Deaths under One Year per 1,000 Births.
England and Wales	20.6	12.9	77
105 county boroughs and great towns, including London	21.5	13.0	81
155 smaller towns (estimated populations from 20,000 to 50,000 in 1921)	20.5	11.7	75
London	21.4	13.4	73

The death rate for England and Wales relates to the whole population, but that for London and the groups of towns to the civilian population only.

The birth rate of England and Wales as a whole is the lowest recorded except during the war years 1915–19, while the infant mortality is the lowest on record.

Universities and Colleges.

UNIVERSITY OF OXFORD.

THE electors to the Whitley Professorship of Biochemistry have appointed Dr. R. A. Peters to this chair. Dr. Peters is Fellow and Lecturer of Gonville and Caius College, Cambridge, and since 1919 has been Senior Demonstrator of Biochemistry in the University of Cambridge. He graduated in medicine in 1915 and proceeded M.D. in 1919. During the war he served with a commission in the R.A.M.C. (S.R.), being promoted brevet-major and winning the Military Cross.

UNIVERSITY OF CAMBRIDGE.

CONGREGATIONS will be held during the Lent Term at 2 p.m. on February 10th and 16th and March 3rd and 9th.

A special syndicate to consider and report on the duties and responsibilities of the State Medicine Syndicate was appointed at a congregation held on January 20th. The members are: the Vice-Chancellor (the Rev. Dr. Pearce); Sir Hugh Anderson, M.D., Master of Gonville and Caius; Dr. H. R. Dean, Professor of Pathology; Mr. W. W. Buckland, Regius Professor of Civil Law; Sir William Pope, Professor of Chemistry; Mr. F. J. Dykes; and Mr. F. J. M. Stratton.

E. St. G. S. Goodwin and A. E. Clark-Kennedy have been approved for the degree of M.D.

The following candidates, after examination, have been approved for the Diploma in Tropical Medicine and Hygiene: H. T. Levieux, W. P. H. Lightbody, J. Misquitta, F. W. O'Connor, and J. M. Surveyor.

The following medical degrees were conferred on January 20th:

M.D.—E. Beaton.
M.B., B.CH.—W. L. Berry.
M.B.—S. P. Castell.
B.CH.—P. Verdon, H. A. A. Pargeter.

VICTORIA UNIVERSITY OF MANCHESTER.

MISS MURIEL M. NUTT (Nat. Sci. Tripos Camb.) has been appointed Demonstrator in Bacteriology.

UNIVERSITY OF EDINBURGH.

THE following have been appointed External Examiners:—In Materia Medica: Professor W. E. Dixon, F.R.S. (Cambridge); in Midwifery: Professor Emeritus Henry Briggs (Liverpool).

Professor Cossar Ewart has been reappointed a representative of Edinburgh University on the Council of the Scottish Marine Biological Association for the current year.

UNIVERSITY OF ST. ANDREWS.

AT a graduation ceremony held at St. Andrews on January 19th Professor James Irvine presided and inducted Dr. H. Stanley Allen, formerly of Edinburgh University, to the chair of natural history. The following degrees were conferred:

M.B., CH.B.—D. A. K. Cassells, Jean M. Davidson, W. S. D. Elder, M.A., B.Sc., Ruby N. Foggie, P. G. Grant, C. R. Henderson, Mary M. Jack, Norah M. Lindberg, Gracie B. M'Rore, Jean H. Morton, Janet L. A. Muirhead, M.A., S. S. Ogilvie, A. B. Richardson, Nora A. M'D. Rodger, Jamiat Singh, Blanche D. S. Spence, W. A. Steel, W. Thomson, T. Wilson.
M.D.—James Irvine.

UNIVERSITY OF LONDON.

A COURSE of eight lectures on the physiology of the cortex as investigated by the method of conditioned reflexes will be given by Dr. G. Anrep, at University College, Gower Street, W.C.1, at 5 p.m. on Fridays, January 26th, February 2nd, 9th, 16th, 23rd, and March 2nd, 9th, and 16th. Attendance at this course is recognized in connexion with the B.Sc. (Honours) Degree in physiology. Admission to the lectures is free.

Medical News.

AT the annual dinner of the Honourable Society of Cymmrodorion on January 19th, at which the Prince of Wales was the guest of the evening, he was presented with the medal of the Society and consented to become its patron. It was announced during the evening that Mr. Dan Radcliffe, shipowner, of Cardiff, had undertaken to present £50,000 in 3½ per cents., to the University of Wales in honour of the Prince, who is its chancellor.

THE next meeting of the Hunterian Society of London will be held at the Mansion House on Monday, January 29th, at 8.45 p.m., when the second Hunterian lecture will be given by Sir Berkeley Moynihan on the present position and treatment of gastric and duodenal ulcers. Discussion will follow.

THE festival dinner of the Royal Medical Benevolent Fund Guild will be held on Tuesday, January 30th, at the Hyde Park Hotel, London, with Lady Barrett, C.B.E., M.D., M.S., in the chair.

DR. MAJOR GREENWOOD, Reader in Medical Statistics in the University of London, will give a course of twelve lectures in the Department of Applied Statistics at University College, Gower Street, W.C., on the application of biometric methods to the study of nutrition, including history, theory, and experiment, on Mondays, at 5 p.m., beginning on February 5th. Miss Elderton, Galton Research Fellow, will also give an elementary course of twelve lectures on statistical methods on Thursdays, at 5 p.m., beginning on February 8th. The fees for the courses are one guinea each.

THE Maudsley Hospital of the London County Council will be opened formally on Wednesday, January 31st, by Sir Arthur Griffith-Boscawen, Minister of Health.

THE fifth annual reunion dinner for overseas medical officers, West Lancashire area, will be held on Thursday, February 8th, at 7.30 p.m., at the Exchange Station Hotel, Liverpool. Tickets may be obtained from the honorary secretary, Dr. J. W. Burns, 49, Rodney Street, Liverpool.

A SERIES of lectures in midwifery subjects will be given at Queen Charlotte's Hospital, Marylebone Road, N.W., by the members of the hospital staff at 5 p.m. every Thursday from February 1st to March 8th inclusive. These lectures are intended for students and practitioners, and are free.

THE King has granted to Dr. Leonard Bousfield, chief sanitary officer, Sudan Government, and Dr. Vincent S. Hodson, director, Civil General Hospital, Khartoum, his permission to wear the decoration of the Order of the Nile (third class) conferred upon them by the King of Egypt in recognition of valuable services rendered.

SIR NORMAN MOORE, Bt., M.D., who died on November 30th, 1922, left estate valued at £18,786.

THE Fellowship of Medicine has arranged a further series of post-graduate lectures, open to members of the profession, to be given, by the kind permission of the Royal Society of Medicine, at 1, Wimpole Street, during February and March. The opening lecture on Wednesday, February 7th, at 8.30, will be given by Mr. J. P. Lockhart-Mummery on diverticulitis, and others will follow by Dr. G. A. Sutherland, Mr. Cecil Rowntree, Dr. George Riddoch, and Mr. A. J. Walton. A course of six lecture-demonstrations on certain diseases of children will be held during February at the Children's Clinic, Western General Dispensary, Cosway Street, N.W.1, on Tuesdays and Fridays, at 5 p.m. The first will be given on Tuesday, February 13th, by Sir William Bayliss on "The physiology of digestion," and others on related subjects by Dr. Bernard Myers will follow, the concluding lecture on Friday, March 2nd, being devoted to "The nervous child, as seen in general practice." The fee for the course is one guinea; full particulars of both courses can be obtained from the Secretary to the Fellowship of Medicine, 1, Wimpole Street, W.1.

IN honour of St. Apollonia, who, we are informed, was recently "installed as the Patron Saint of Dentistry," the organization called the Ivory Cross has arranged to hold a banquet at the Hotel Victoria, London, on February 9th. Tickets (price one guinea) can be obtained on application to any member of the Dental Committee, or at the offices of the Ivory Cross, 10, Henrietta Street, London, W.1.

DR. J. M. H. MACLEOD has been appointed consultant physician for diseases of the skin to the Metropolitan Asylums Board in succession to the late Sir James Galloway.

DR. J. A. EWAN, on the occasion of his retirement from the office of medical superintendent of the Kesteven Asylum after twenty six years' service, has received a public presentation.

AN extraordinary general meeting of the London County Westminster and Parr's Bank, Ltd., will be held on February 1st, when it will be proposed to change the name to "Westminster Bank Limited." The proposal will have to be confirmed at another meeting, to be held on February 16th.

THE *London Gazette* publishes a correction of the Christian names of Dr. David Watt Torrance, medical missionary, Scottish Hospital, Tiberias, upon whom the O.B.E. was conferred in the New Year's honours.

DR. CHARLES VAILLANT, the Paris radiologist, who lost both arms as the result of *x*-ray burns, has been promoted to the rank of Commander of the Legion of Honour.

DR. G. M. VEVERS, a Beit Memorial Research Fellow and assistant helminthologist at the London School of Tropical Medicine, has been appointed Superintendent of the Zoological Society's Gardens, in succession to Mr. R. I. Pocock, F.R.S. Dr. Vevers has been honorary parasitologist to the Society since 1921.

A PUBLIC lecture on psychotherapy and religion, arranged by the Guild of Health, will be given by the Rev. L. W. Grensted, Principal of Egerton Hall, Manchester, at the Central Hall, Westminster, on Wednesday next. The chair will be taken at 8.15 p.m. by Dr. William Brown. Admission is free; a collection will be made.

Letters, Notes, and Answers.

As, owing to printing difficulties, the JOURNAL *must be sent to press earlier than hitherto, it is essential that communications intended for the current issue should be received by the first post on Tuesday, and lengthy documents on Monday.*

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.*

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—of course not necessarily for publication.

AUTHORS desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Office, 429, Strand, W.C.2, on receipt of proof.

IN order to avoid delay, it is particularly requested that ALL letters on the editorial business of the JOURNAL be addressed to the Editor at the Office of the JOURNAL.

THE postal address of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is 429, Strand, London, W.C.2. The telegraphic addresses are:

1. EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology, Westrand, London;* telephone, 2630, Gerrard.
2. FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate, Westrand, London;* telephone, 2630, Gerrard.
3. MEDICAL SECRETARY, *Medisecra, Westrand, London;* telephone, 2630, Gerrard. The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin;* telephone, 4737, Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh;* telephone, 4361, Central).

QUERIES AND ANSWERS.

DRS. LIBA ZARCHI and CLARA SEGAL (London) ask for advice in the treatment of a woman, aged 62, who for fifteen years has suffered from persistent headaches, occurring nearly every day and lasting about twelve hours. They are not of the migraine type, but are accompanied by great depression and abdominal distension. Treatment by sodium luminal in 1-grain doses has produced no benefit.

DULL HAIR.

"O. P. Q." asks for suggestions for treatment in the case of two fast-growing girls, ages 12 and 17, whose hair is dull and lifeless in appearance. There is no dandruff at present, and careful brushing and washing are practised by the mother. He asks if a course of thyroid in fractional doses would be of service. The general health is good.

*** To a not inconsiderable extent the condition of the hair depends upon the general well-being, and as in the cases quoted there is rapid growth of the two girls the defect of the hair is to some extent dependent upon the strain put upon the body generally by this cause. When there is, in addition, dandruff—and this condition or the causes producing it have a detrimental effect on the hair—resorcin should be used as a local application. The following formula is suggested: Resorcin 1 drachm, sp. rosmarini 1 drachm, ol. ricini 1 drachm, tr. quillaiae 1/2 oz., and water to 6 oz. A thorough washing of the scalp once every ten to fourteen days with a solution of green soap (sapo mollis *B.P.*) is an advantage. It is doubtful if thyroid would prove of much assistance.

TREATMENT OF INFANTILE PARALYSIS.

"P." describes a case of infantile paralysis involving both lower limbs from the buttocks downwards. The child is now 2½ years old; the paralysis came on suddenly about eighteen months ago. Massage and electricity have been used, and celluloid moulded splints applied. There is a slight return of movement in a few of the toes. "P." asks for advice as to treatment and prognosis.

*** We referred this inquiry to Mr. Muirhead Little, who writes in reply: "The only treatment I can suggest is the use of apparatus (splints, etc.) for the purpose of preventing the formation of contractions, massage to improve the nutrition of the parts, and the encouragement of any slight movements which are now possible by means of assisted exercises. Electrical treatment is not likely to be of any use. The most that can be hoped for in such a case is that the patient may be able to get about on crutches with suitable walking instruments."

INCOME TAX.

"G. S. K.'s" car transactions have been as follows:

	Car. £	Motor Cycle. £ s. d.
Original cost	470	..... 70 0 0
Sold in 1921 for	160	..... 30 0 0
In 1921 a similar car would have cost	650	..... 74 10 0
New car bought (presumably in 1921) for ...	340	
Replaced by car costing	233	

*** We advise "G. S. K." to claim that the car and motor cycle should be regarded as one group or set of professional means of locomotion, and to calculate the replacement costs accordingly, thus:

Total original expenditure	£470+£70=£540
Deduct total amount received	£160+£30=£190
	£350

The total amount actually expended was £340+£233=£573, which, allowing for the increase in prices generally, does not indicate any improvement of the motor equipment as a whole, and therefore the whole of the £350 is allowable as a professional expense.

LETTERS, NOTES, ETC.

DETERMINATION OF SEX.

DR. R. A. PARKER (East Kew, Victoria) writes: Dr. R. W. Marsden, in your issue of September 30th, 1922 (p. 616), draws our attention to this subject by referring to a "surmise" of his own.

In a country district of Australia, where I formerly practised medicine, it was found by some of the residents who kept cows that if a cow fell in calf on the occasion of the first time of bulling after parturition the result generally was the birth in nine months' time of a bull calf, but that if a calf were born as the result of conception occurring at the second time of bulling, then the calf was a heifer. If conception occurred on the odd times of bulling a bull calf resulted, but if on the even times of bulling then a heifer calf was to be expected. Such a method would tend to lead to the production of about equal numbers of males and females, with a somewhat higher percentage of males as the result of more frequent conception at the first time of bulling.

Might this idea not be applied to menstruation? The production of twins of opposite sex makes this or any other theory difficult of explanation. The fact that uniovular twins are of the same sex perhaps lends support to the above idea; but where more than one ovum is shed such ova may individually each only have the power of attracting either a male or a female producing sperm, and thus twins of opposite sex may result, although heredity on the paternal side appears to be a factor.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 34, 35, 38, and 39 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 36 and 37.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page 23.

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

	£ s. d.
Six lines and under	0 9 0
Each additional line	0 1 6
Whole single column (three columns to page) ...	7 10 0
Half single column	3 15 0
Half page	10 0 0
Whole page	20 0 0

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Tuesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

NOTE.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.